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STREET CLEANING IN PHILADELPHIA

Anti-Littering Campaign Reduces Amount of Cleaning To Be Done—How It Was Conducted—Hose and Machine Flushing—Cleaning and Ash Removal Done by Contract—Motor Vehicles.

In terminating his work as chief of the Bureau of Highways and Street Cleaning of the city of Philadelphia, William H. Connell has prepared his customary comprehensive and interestingly written report concerning the operations of the bureau for the year 1916, from the advance manuscript copy of which are taken some of the more generally interesting features described below.

ANTI-LITTERING CAMPAIGN.

"It is quite generally recognized that the responsibility for the maintenance of the public highways in a clean and sightly condition is largely a matter of consistent and continuous co-operation between the general public and the municipal government. It is perfectly obvious that no matter how frequent or how thoroughly the streets may be cleaned, the results would not be evident unless the citizens realize this dual responsibility and exercise care in the observance of the laws whose violation results in unnecessarily littering the highways."

Acting upon this idea, the bureau last year conducted a campaign against littering of streets. The first step was the issuance of a general order by William H. Wilson, director of the Department of Public Safety, and James Robinson, superintendent of police, calling the attention of the police force to the proposed campaign and to the several laws governing clean streets and the matters incidental thereto, and indicating that in the future these were to be strictly enforced.

Following this, 400,000 notice cards were printed, containing a brief statement of the objects of the campaign and explaining the existing laws against street littering, with quotations from the laws, including the penalties for their violation; the whole accompanied by the admonition "To avoid error, know the law; to avoid the penalty, obey the law." These cards were distributed to the several district police stations and were served by the patrolmen personally on a responsible occupant of every home and other buildings throughout the city. In addition, large placards were placed in prominent windows and other locations throughout the city, in trolley cars, etc. Personal letters were sent to the executives of the several public service corporations and large business concerns, explaining the purpose of the campaign and requesting their co-operation.

From the very beginning, the newspapers of the city co-operated enthusiastically, publishing daily accounts of the progress of the campaign and appealing to the citizens to assist the officials in their efforts to improve the appearance of the streets. Warning letters were drafted and sent to the several classes of persons or agencies who, it was found, were habitually violating the laws, such as distributors of advertising literature, contractors owning or having control of vehicles transporting dirt and other fragmentary materials through the highways, and store keepers who make a practice of placing store sweepings or rubbish on the highways.



NEW PHILADELPHIA TYPE OF ASH COLLECTION VEHICLE.

Has a low body, can be loaded easily, and when closed up is dust proof while loading and hauling. It is expected these will ultimately replace the horse-drawn vehicles.

Following this, 12 special inspectors were assigned to educational work, conducting a house to house canvass in sections of the city where this would seem to be most useful and explaining what the law required and how to observe it. In general it was found that street littering by householders was due principally either to ignorance of the existence or requirements of the law, or to carelessness resulting from the fact that the laws had not been enforced. When they learned that enforcement was to be required, however, all seemed to be in hearty accord with such enforcement, and it was necessary to institute legal proceedings against only a very few who remained obstinate and refused to discontinue violations of these laws. Later on, policemen in uniform accompanied the educational squad in visits to these obstinate cases, and were found to enforce a respect which would not be accorded to men not in uniform.

Through this co-operation of the superintendents of public and parochial schools, all the teachers in the city were required to explain the object of the clean streets campaign to the school children in connection with the course in civics. An organization entitled the Society of Clean-Up Boosters, familiarly known as the C U B S, was formed and the general public invited to join, there being no dues but merely the signing of a pledge to "Help Keep My City Clean."

The bureau enforced more stringent regulations governing the occupation of highways with building materials. Approximately 2,000 additional rubbish receptacles were placed at prominent locations and in front of every public and parochial school throughout the city, and it is expected to increase this number to 5,000 during 1917.

It is believed that through this educational campaign the citizens have become thoroughly familiar with the ideas involved in clean streets, and that in the future efforts will need to be directed only toward enforcing the

laws. Already it is believed that the results secured in preventing the littering of streets has so far reduced the cost of street cleaning as to fully pay for the expense involved in the educational campaign.

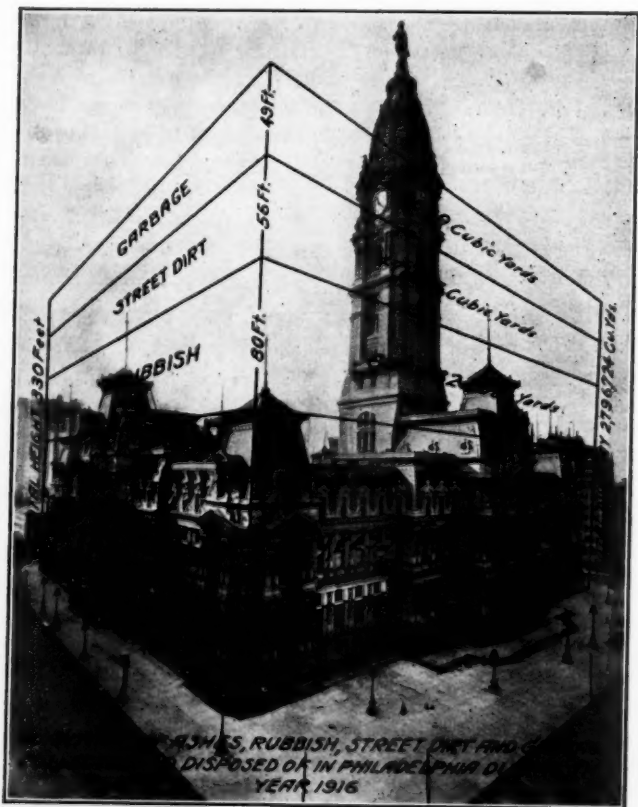
STREET CLEANING.

Automobile street flushers were introduced in an experimental way in two districts in 1915, and proved so efficacious that their number was increased to 7 in 1916, and it is intended to add 8 more during 1917. The special hose gang which was organized during 1915 for the hose flushing of streets in the central district performed its work to such advantage that two such gangs were used in 1916, and it was proposed to increase this number to 7 in 1917. These hose gangs, as well as the flushers, were utilized all through the epidemic of infantile paralysis. This increasing tendency to perform street cleaning by flushing rather than by sprinkling and sweeping is due to the belief that the most effective method of cleaning is hose flushing. Unfortunately the limited amount of money available in Philadelphia for street cleaning purposes will not enable the further extension of hose cleaning at present, owing to the increased cost of this over other methods of cleaning.

Until 1915 street cleaning specifications required contractors to clean streets with certain frequency and to perform certain other definitely specified operations, but did not specify the number of men or equipment that would be required to be used for this service. In 1915, however, a definite schedule of the minimum force of labor and equipment to be employed was included in the specifications, and this operated to such advantage to the city that the requirement was continued in 1916.

The records of the bureau not only contain reports as to the actual work performed each day, but careful studies and records are kept of the costs, both for the operation of each unit of equipment and of cleaning per thousand square yards of surface by each method. These cost records are of special value in determining the character of cleaning to be specified for certain districts each year, and, combined with knowledge of actual conditions in each district, enable the following year's work to be formulated to the best advantage. Schedules, together with the frequency and order of cleaning each street and the type of equipment and character of cleaning employed thereon, are also being studied continuously, and from the data so obtained, together with studies of the traffic census on the different streets, the routes are scheduled, effort being made in each case to have the streets cleaned when it will cause the least inconvenience to the people and also to clean them as soon as possible after the collection of ashes and rubbish have been made.

"One of the greatest sources of untidy conditions lies in the fact that the city only cleans the paved areas of the streets, while the property owners are supposed to clean the sidewalks. No regulation as to the time or manner of this cleaning is enforced and, as a result, the paved areas of a street may be thoroughly swept and then a few hours afterwards the accumulation of dirt swept into the street will create a condition as bad as before any cleaning had been done. When it is appreciated that, of the total area of the streets from house line to house line, but little over half, consisting of the roadway, is covered by the city cleaning, the remainder being occupied by sidewalk spaces, the importance of these conditions may be recognized." Owing to the fact that sufficient appropriation is not available for cleaning the sidewalks, the department has not performed this work, although recognizing the desirability of doing so.



ASHES ALONE COLLECTED IN 1916 WOULD MAKE A PILE AS LARGE AS AND HIGHER THAN THE PUBLIC BUILDINGS.

The work for this year involves not only the cleaning of a larger area of pavements, but also more frequent cleaning of certain districts. In the central portion of the city where cleaning was done three times a week in 1916, it will be performed daily this year. Another section will have the amount of cleaning doubled, in still another the number of cleanings will be increased from two to three times a week. The average yardage cleaned each day this year will be about 9 per cent more than in 1916.

Every effort has been made to utilize as nearly as possible the type of equipment best suited for each particular street; and as the necessity for flushing has been more and more clearly emphasized, the greatest increase in equipment this year has been in connection with motor driven flushers, which, as has been stated, have been increased from 7 to 15, and hose flushing gangs increased from 2 to 7.

Two other noteworthy innovations in this year's contracts will be the provision for the employment of extra men to work on some of the principal thoroughfares of the city on the mornings of Sundays and holidays. There is always an accumulation of paper and refuse on the streets as a result of the Saturday night crowds, and provision is made by this arrangement to have this material removed early Sunday morning, so as to give a presentable appearance to the streets over Sunday. Also the contractor for cleaning the central district is this year required to flush the important business streets and cross streets on Sunday night, which will greatly relieve the unfavorable appearance usually presented by these streets on Monday morning.

One of the operations of street cleaning that has always given trouble and one that has generally reduced the effectiveness of the work has been in connection with the removal of dirt swept into piles by the cleaning gangs. Under former specifications the contractors were required to remove these piles of dirt and clean the sites where the piles had been made, within one hour after sweeping. While this was sufficient at times in the residential districts and on the lightly travelled streets, on the so-called heavy traffic streets, owing to the increased number of vehicles using these streets, most of the piles formed by the cleaners were distributed by traffic and scattered by the wind in the intervening hour, with the result that a great proportion of the dirt often had been scattered back on the street before it could be removed by the carts. To remedy this, it is provided this year that all winrows formed by the street cleaning equipment shall be swept into piles by men following the equipment not more than two blocks distant, and that these piles must be taken up and removed within 15 minutes after piling.

When bids were asked for this year's work, those received for the majority of districts were considered too high and were re-advertised, some of them a second time, with the result of an appreciable lowering of the later bids. Even with the increased amount of cleaning this year, the city will pay only 9.3c per square yard per year for the street cleaning service, while New York pays approximately 17c. It is hoped, however, that with the co-operation of the citizens in preventing street littering, all streets can be kept in a presentable condition.

ASH AND RUBBISH COLLECTION.

Prior to 1915, contracts for removing ashes and rubbish were combined with those for street cleaning; but beginning with that year these were let under separate contracts and this has been demonstrated to be desirable from an administrative standpoint.



NEW TYPE OF EQUIPMENT FOR HOSE FLUSHING.

During 1915 the contractors were asked to place canvas covers mounted on frames over their ash wagons. These covers were so satisfactory and so greatly reduced the amount of material spilling from the wagons or blowing from them, that it was made a requirement of the 1916 specifications that they be used on all ash wagons. It was also stipulated in 1916 that new rubbish wagons provided by the contractors during the year should be built with solid sides instead of the open racks that are largely used at present. In the 1917 specifications it is required that all wagons used for rubbish collection shall have solid sides which will entirely prevent the spilling of rubbish after it has been collected.

With the same end in view, the principal improvements in the specifications drafted for the 1917 contracts are regulations for handling the work so as to still further minimize dirty conditions resulting from the collections. As the present type of wooden ash wagon, after being in service for a while, is apt to leak, especially around the tail board, this year's specifications stipulate that the contractors for each of the ash removal districts will be required to provide 10 metal wagons for the removal of ashes, which can be dumped from the end without the use of a tail board. It was also proposed to require the contractor to furnish an additional number of modern type wagons or automobile trucks so that within three or four years all of the equipment in use in the city will be of this character.

The use of motor vehicles for the collection of ashes is considered desirable and it is probable that in all cases, except possibly where unusually short hauls prevail, this type of equipment will prove both economical and of advantage to the city, as the horse-drawn equipment is in itself a factor in producing street dirt. To this end the contractor for each ash removal district will be required this year to furnish at least one motor driven truck for work in ash removal. The contractor in one of the districts is so convinced of the economy of this type of vehicle that he has installed exclusively motor driven equipment for making his collections, and every effort will be made by the city to encourage this practice.

In the matter of snow removal, it is proposed to progress further along the lines already adopted tentatively, beginning snow removal as soon as the snow has started to accumulate, rather than waiting until the storm is over. The 10 motor driven snow plows proved such an important factor in the previous year's work, that they were increased by 20, these plows almost entirely doing away with horse-drawn plows. The motor

driven snow plows are used on all the main thoroughfares, in addition to the central business section, and some are also sent out into the country to open up important roads that have been blocked by snow drifts.

PHOTOGRAPHS FOR STUDYING FILTERS

Ice Forming on Beds in Winter Indicates the Area Covered by Spray, and Intensity of Discharge at Different Points.

In "The Cornell Civil Engineer" for April is an interesting short article by C. L. Walker describing a method of using winter photographs of sprinkling filters as aids in studying the relative distribution efficiency of nozzles. These photographs were taken at the sewage treatment plant at Brighton, operated by the city of Rochester, N. Y., and were used through the courtesy of E. A. Fisher, consulting engineer to the city, and M. A. Bantrell, engineer and chemist at the plant.

Nozzles of the Columbus, Taylor and Worcester type were used in this filter, placed side by side in the filter and were, therefore, being operated under the same conditions of head, wind, spacing, temperature, frequency of use, etc.

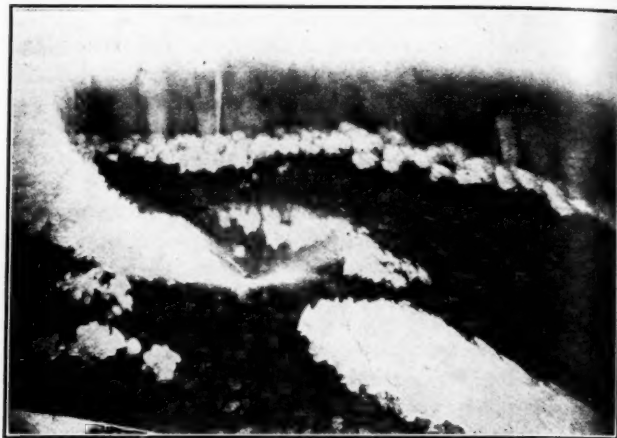
The spacing is 14 feet 4 inches, and the head under which they operate varies between 4.5 and 2 feet. The general photograph was taken during the morning of February 10th, and the others in the afternoon of February 13th. During this time the temperature had been slightly below or near zero much of the time.

"In the interpretation of the photographs it has been assumed that ice would form first on those portions of a filter receiving the least flow, either directly or by splashing, and that for the same time of application it would appear first on that portion of the filter receiving the flow in the finest spray or droplets.

"The general view shows the beginning of the formation of ice on the areas not included within the circles of influence of adjacent Worcester nozzles, the existing opening ranging from 12 to 36 inches. At the same time the areas about the Columbus nozzles were nearly closed with ice, some craters being completely formed. By February 13, the continued cold had caused craters to be formed around each distributor though the craters around the Columbus nozzles were smaller than those around the other two models. Approximately 27 per cent of the total area of the filter was under a cover of ice outside

of the area receiving flow and could receive flow laterally only. At the same time some of the area within the craters was covered to such an extent that the flow was concentrated more than when it left the nozzles.

"Differences in distribution by individual nozzles are brought out by the reproductions. The Columbus nozzle here shown in operation clearly indicates the effect of the arms supporting the cone, the solid ice masses indicating that less flow is received back of these arms than elsewhere. The ice ring forming near the riser pipe and around the edge of the crater suggests that these areas receive flow for a shorter period than the rest of



COLUMBUS NOZZLE IN OPERATION.



COLUMBUS NOZZLE.

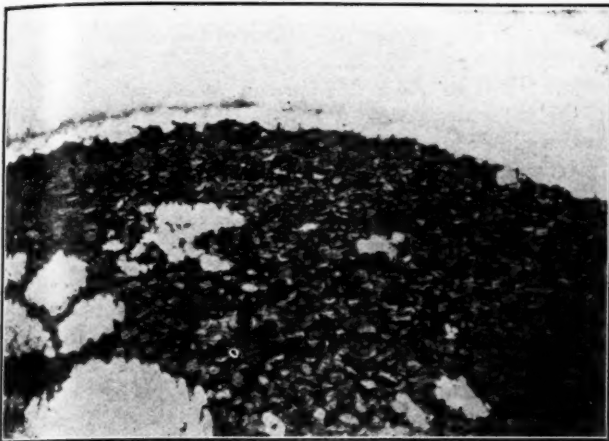


GENERAL VIEW OF WORCESTER NOZZLES.

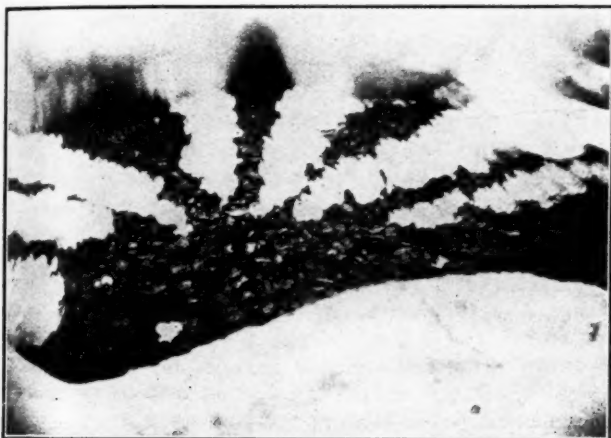
the area within the crater.

"In the next view, a Columbus nozzle, the masses of ice opposite the supporting arms of the cone emphasize more thoroughly the slight distribution of sewage in these areas. In this view the cover of ice over the entire crater is undoubtedly due to the fact that this particular nozzle was located in a corner of the filter bed and was in a more exposed position than the others. For a just comparison of the nozzles considered, this view should not be given as much weight as the others. The extent to which the area of a sprinkling filter, in our latitude, may be covered is, however, forcibly suggested. Under such conditions the applied sewage must pass through the filters in pronounced streams and in a short time.

"In the Taylor circular nozzle, most of the area within the crater is still open and the small fringe of ice surrounding the area suggests that a fairly pronounced distribution takes place to the limiting circle of influence.



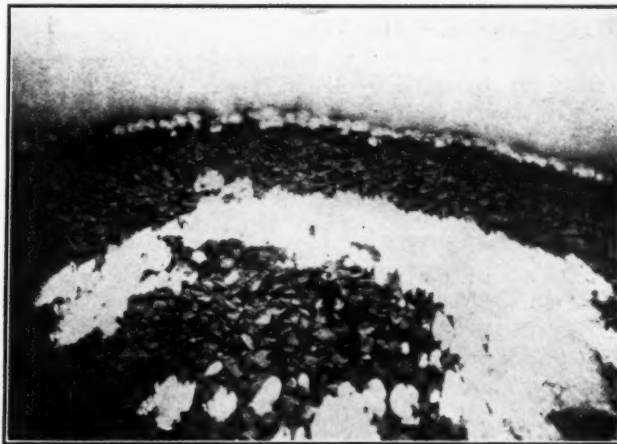
TAYLOR CIRCULAR NOZZLE.



TAYLOR HEXAGONAL NOZZLE.

While some formation is found within the crater, this nozzle shows about as small an amount of covered area as any of the others and hence as even a distribution.

"The Taylor hexagonal nozzle, designed with the intention of utilizing area to better advantage than the circular type by reducing the area of the bed not reached by the spray, seems to give less satisfactory distribution. The deep recess in the immediate background of the view with the steep sloping sides indicates flow from a stream of droplets having a trajectory much more nearly vertical than the flow from adjacent portions of the nozzle. This flow can be seen to come from the recess of the periphery of the cone and directly in line with the axis of the cone and the deep recess in the ice. The less pronounced depressions in the ice wall on either side of the deep central one are seen to be caused by the more horizontally directed flow from the lobes of the nozzle. Between these radii of heavy distribution there appears to be an area, a sector, of slight flow. In a study of distribution of this nozzle by the use of radially placed pans, these narrow sectors of poor distribution might easily be missed. The absence of a fringe of ice about the periphery of the area receiving flow, except in the sector of poor distribution, would seem to suggest that the flow from this nozzle is more pronounced to the limit of the influence of the nozzle than the Columbus and the Worcester, particularly the former, in the area of heavy distribution.



WORCESTER NOZZLE.

"Considering the entire area, the Worcester nozzle seems to show better distribution to the edge of the crater than either of the other types. It has, however, a much more pronounced ice area near the nozzle than either of the others. The opening in the annular ring of ice at the left of the view would seem to suggest greater feed from that side of the nozzle, due possibly to eccentricity of opening to the cone at the vertex, of lack of verticality of the cone, lack of verticality in the nozzle as set in the riser pipe, or an inclination in the riser pipe itself. The Taylor nozzles suggest possibility of the same difficulty.

"While such views cannot take the place of quantitative tests, they do give relative quantitative result of the entire area reached by a distributor and show the need of a careful study of the entire area when studies of distribution are being made."

WATER METERING AND CONSUMPTION IN SPRINGFIELD

Effect on Consumption of Twelve Years' Increase in Metering—All Private Services Now Metered, and Some Public Ones.

In our issue of May 3rd, 1917, we quoted, from the 1916 report of the Water Commission of Springfield, Mass., the opinion of that commission concerning the desirability of metering water used for public purposes. Although the public buildings and other public services in Springfield are not metered, the city has made considerable progress during the past 10 years in metering private supplies, and a brief inspection of this history, combined with that of the per capita consumption may be of interest.

In 1905 metering had already become pretty well established, the board stating in its annual report that "it has been the policy of the board to encourage the use of meters during the past year. On April 4th, the board voted that in the future all new service taps should be metered, and later required that all breweries and livery stables should be supplied only by meters. * * * The board believes that the time is not far distant when all classes of consumers will be required to have meters."

The following year the classes of those already connected to the water system that were required to install meters were extended to include public garages, public laundries, and all house service pipes that were larger than 1¼ inches in diameter. In that year also was installed a system for recording the history of each meter and systematic testing and repairing of them. The board also ordered all meters sealed and also all gates on

fire services and private fire hydrants; the object apparently being to reduce unlawful consumption as much as possible. That these methods were more or less successful was indicated by the fact that the consumption per tap fell off from 942 gallons per day in 1905 to 875 in 1907. The consumption remained at almost exactly this figure through 1908 and 1909, but in 1910 fell to 844. In the meantime, the percentage of services metered was increasing at the rate of about 4 per cent. a year, being 60.76% of all services in 1910.

The effect of metering the larger consumers is evident from a comparison of the percentage of services metered and percentage of consumption metered. In 1905 the latter was a little less than 50 per cent of the former, whereas in 1910 the percentage of metered consumption was 75 per cent of that of the metered services. In its report for 1907 the board stated that the installing of meters on all pipes over 1¼ inches in diameter "has had the desired effect of reducing the waste among the large consumers." During this year a large and well-equipped meter room was added to the department for testing and repairing meters. During 1908, 586 new meters were tested and set, including two 8-inch, and in addition 1,350 meters were taken out and tested, cleaned, repaired and reset; the total number of meters in service being 6,417. The cost of meter testing this year was \$343, and that of installing the meters was \$1,261.

In 1910 the board called attention to the matter of metering public buildings, stating that there were 87 taps for serving these which varied in size from 1 to 8 inches, none of which was equipped with a meter. It requested that it be given authority and funds to meter all municipal buildings; but the report for 1916 indicates that neither then nor during the following six years did the city authorities see fit to grant this permission.

In 1911, 64.8 per cent of the services were metered and the board endeavored to speed up the installation of meters so as to hasten as much as possible the approach to the desired end of metering every private service in the city. In that year there still remained 3,500 meters to be set in order to effect this. During that year 752 new meters were set and 1,650 old meters were repaired.

Between 1911 and 1912 the percentage of services metered increased from 64.8 per cent to 74.4 per cent. These were mostly of the smaller consumers, as is indicated by the fact that the percentage of consumption metered increased only from 48.3 to 53.9. In the meantime, the consumption per tap had been reduced from 875 in 1907 to 795 in 1912.

Nineteen hundred and twelve was a record year for meters, 3,033 meters having been installed during that year. Owing to the growth in population, however, there still remained about 1,000 services to be metered. Again

the city called attention to the desirability of metering public buildings, showing that there were 281 unmetered services to such buildings and to standpipes for sprinkling carts and street watering. One school alone was found to have used more than 7,000,000 gallons of water during the year. The extensive metering of this year reduced the percentage of unmetered services to 5½ and reduced the consumption per tap to 784 gallons per day in 1913. During 1913, 1,372 meters were installed, bringing the total up to 12,872 and by the end of the year all private supplies were metered. In addition, 16 meters of all sizes up to 6-inch were set on the services devoted to public use.

The work of metering all new supplies has been continued. In 1915 detector meters were ordered set on all fire protection services, but it was found difficult "to convince many of our customers of its necessity and it requires a good deal of tact, some diplomacy and much argument in some cases to secure the order without friction." With this gradual filling out of the corners of the metering program, the percentage of services metered has increased from 95.5 in 1914 to 97.74 in 1916.

Meantime, the percentage of consumption metered increased from 69.17 in 1914 to 75.40 in 1915, but fell to 70.73 in 1916. No explanation is given of this, but since the only unmetered services were those providing water for public uses, it would appear as though the amount of water so used increased about 20 per cent last year over the consumption of the year before. In spite of this heavy consumption (a large part of which was probably waste) in public buildings and in connection with other public utilities, the consumption in 1915 had dropped to 709 gallons per tap, or 99 gallons per day per consumer, or 98 gallons per day per inhabitant.

In 1916 the commission reported that the matter of setting detector meters on old fire protection services was more or less held in abeyance on account of the condition of the department's finances, but the board was expecting to take the matter up and prosecute it vigorously to completion during the year 1917.

The cost of maintaining the meters has naturally increased with the number of meters in service. In 1905 the cost of this service was only \$461. In 1910 the care and repair of meters was reported to have cost \$3,048; in 1911, \$2,734; in 1912, \$3,523; in 1913, \$3,459; in 1914, \$4,022; in 1915, \$5,356, and in 1916, \$4,418. These do not include the cost of reading the meters, nor of installing new meters. Reading the 14,500 meters in 1916 cost \$3,966 for salaries and \$732 for supplies and expenses.

Apparently the increase in the number of meters by 9,556 between 1905 and 1915 reduced the consumption by 233 gallons per day for each of the 14,642 service taps, or a total of 3,411,586 gallons per day, or 33 per cent. of

Metering in Springfield, Mass., During the Past Twelve Years.

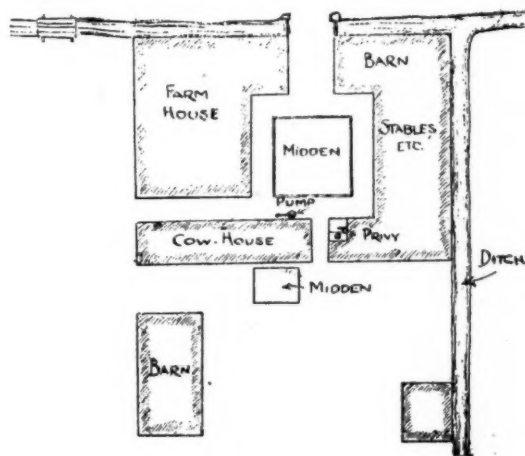
Year	Number of service taps in use	Number of meters in use	Percentage of services metered	Percentage of consumption metered	Gallons per day to each inhabitant	Gallons per day to each consumer	Gallons per day to each tap	Percent-age of receipts from metered water
1905	10,946	4,477	40.9	19.66	133	137	942	41.6
1906	11,175	5,033	45.03	20.3	131	135	939	45.57
1907	11,385	5,789	50.84	27.63	120	125	875	54.29
1908	11,706	6,417	54.82	38.32	120	124	877	63.03
1909	12,134	7,017	57.83	39.32	120	125	874	66.04
1910	12,545	7,622	60.76	45.35	119	121	844	70.37
1911	12,985	8,414	64.80	48.33	115	116	812	71.81
1912	13,407	9,970	74.36	53.92	112	114	795	84.33
1913	13,667	12,970	94.42	63.92	108	109	784	98.35
1914	14,126	13,539	95.5	69.17	105	107	757	99.20
1915	14,642	14,023	97.6	75.40	98	99	709	98.72
1916	15,248	14,597	97.74	70.73	106	108	758	97.32

the consumption. This, however, probably does not fully represent the saving effected, since it has been shown by other cities that the tendency of practically every community is to increase the per capita consumption of water where all conditions liable to limit the consumption remain constant. Also it would appear that a constantly increasing percentage of the consumption has been used for public purposes, thus increasing the general average. It is probable, therefore, that, instead of reducing the per capita consumption about 28 per cent during the ten years, the consumption would have been 35 per cent or 40 per cent greater had the percentage of metered private services not been increased.

SANITATION IN BRITISH ARMY CAMPS

Methods Developed During the Present War for Collecting and Destroying All Kinds of Refuse in Temporary Camps "Somewhere in France."

The sanitation of the camps in which the United States army is to spend the months or years before the end of the war is a matter of the greatest importance. It would be a disgrace to the army and nation if our men were decimated by typhoid and other preventable diseases, as was the case in the Spanish war. We were not alone in this experience in the past, however. During the South African War Great Britain lost from deaths and wounds 6,965 men, while 13,590 died from disease and 72,551 were invalided home. For every soldier admitted to the hospital for wounds, seventeen were admitted for disease. But the Russian-Japanese war proved that this loss by disease is unnecessary, and we have no doubt that our army will equal those of the European nations in the success of its application of modern sanitary science to the prevention of camp diseases.



PLAN OF TYPICAL FRENCH FARMHOUSE.

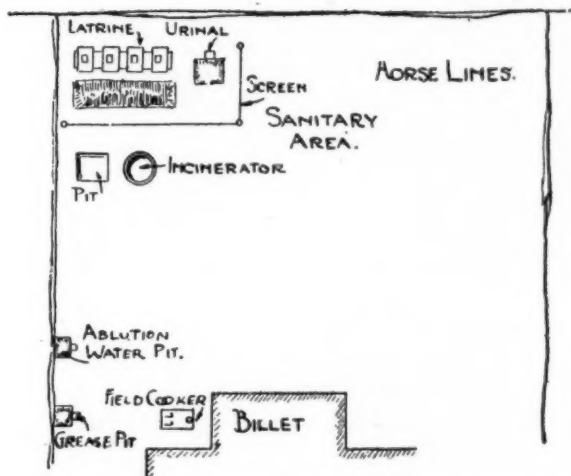
Some of the details of the sanitary arrangements employed by the British Army in France were described in a paper before the (British) Institution of Sanitary Engineers a short time ago, which paper appeared in "The Surveyor and Municipal and County Engineer," to which we are indebted for the illustrations and the article from which the following abstract has been prepared. This should be of additional interest to American readers from the fact that a small but increasing number of our men are probably sheltered in camps under just such conditions "somewhere in France."

At the head of the medical staff of each of the three divisions of a British Army is an Assistant Director of Medical Services, under whom is a Deputy Assistant, a Divi-

sional Officer, and a sanitary section consisting of 25 non-commissioned officers and men who have sanitary qualifications and experience. Attached to these sections are fatigue squads of men who, owing to physical defects, are unfit for work in the trenches. Each of the fifteen battalions in a division has a medical officer who has under him a non-commissioned officer and eight men for sanitary duties and an officer and four men for water duties.

The billets (occupied in wet and cold weather only) consist of schools, factories and private houses in town areas, and barns, farm buildings and huts in country districts. In warm and pleasant weather the men sleep in bivouacs. The farm buildings were found to be constructed on very insanitary lines, the house, barns, pig-sties and out-houses being arranged to form a closed square, in the center of which is a large midden full of manure, straw and foul water into which all slops and foul water is emptied; the whole contents being removed once a year and ploughed into the land. The privy, which consists of a wooden seat over a brick pit, is situated in one corner of the square, the pit being emptied periodically and the contents used as fertilizer in the garden. The pump draws water from a shallow well located within a few feet of the midden and privy.

When occupying such quarters as billets, the troops are forbidden to use the privies, and water is drawn only from approved sources. The middens, which furnish excellent breeding places for flies, are treated in one of the following ways: The contents are removed and spread on land and plowed in; or placed in heaps 200 yards from the billet, treated with chloride of lime and sprayed with a solution of 3 fluid ounces of cresol (liquor cresoli saponatus fortis) to one gallon of water. Or the midden is covered with one foot of earth and treated with chloride of lime and cresol solution. Or it is tidied up, covered with straw, and treated with chloride of lime and cresol solution. No



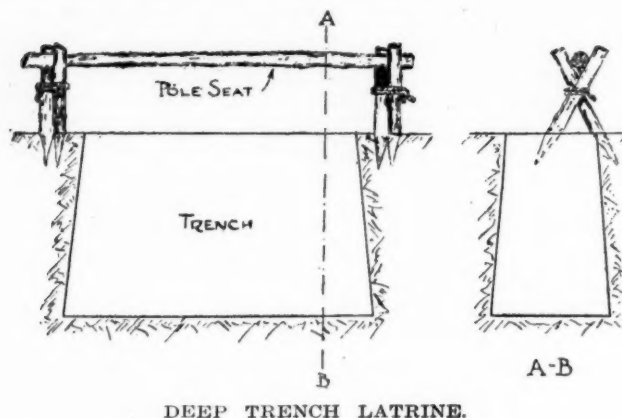
SANITARY ARRANGEMENTS FOR A BILLET.

more manure is placed in the middens, but all fresh manure is ploughed into the farm land daily, or else is placed in pits properly constructed and treated daily as above.

As soon as possible after troops reach a billet, latrines are prepared at the rear, not scattered indiscriminately but confined to a definite part called the "sanitary area." When a unit vacates a set of billets, these sanitary areas are marked for the information of those who may use them later. The site for this area is carefully selected with reference to water supply, kitchens and prevailing winds, and is placed as far as possible from the billet. Disinfectants are used daily in this area to keep flies away. The importance of flies as disease carriers is recognized, and improvised fly-proof food safes are made from wooden

ration boxes, square openings being cut in the sides of these over which are fastened pieces of tin from biscuit tins perforated with small holes.

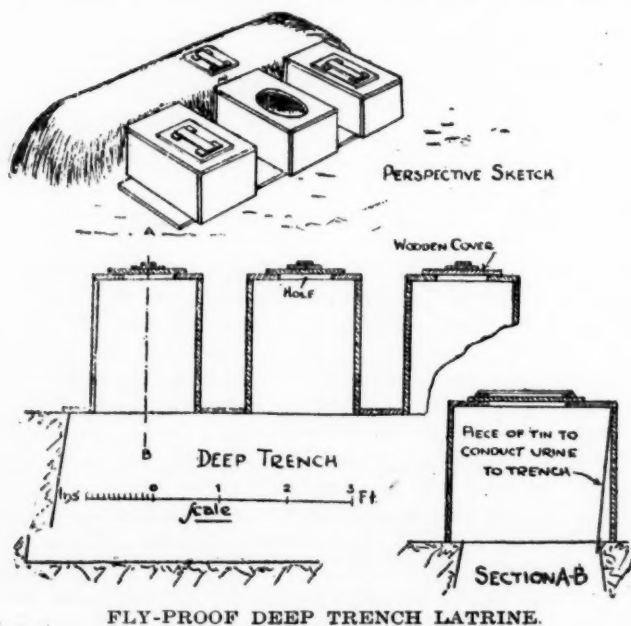
As to the type of latrine and method of disposing of excreta, practise has varied considerably and is being continually improved upon. The system selected depends mainly upon the amount of space available in the vicinity of the billets. During the first winter of the war, in country districts the long and deep trench latrine was in general use. This consisted of a trench about 6 ft. long, 2 ft. wide and 4 ft. to 14 ft. deep, over which is fixed a rough pole seat. The excreta are covered once or twice a day with pulverized earth or chloride of lime.



DEEP TRENCH LATRINE.

With warm weather, these caused considerable nuisance, the uncovered excreta attracting flies, and a shorter and shallower trench was used, 3 ft. long, 1 ft. wide and 1½ to 2 ft. deep. A series of these are dug 2½ ft. apart, the excavated earth is finely pulverized and placed at the back of the trenches, together with the sod. This pulverized earth is used to cover each deposit of excreta immediately. When a trench has been filled to within 6 inches of the surface, which occurs in two or three days, it is filled in with the remaining dirt and the sod replaced. A second set is then dug in the spaces left between the trenches of the first set. The excreta are rapidly broken down to a harmless mould by the nitrifying bacteria.

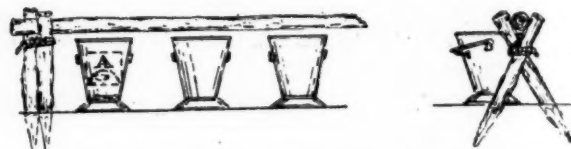
This system, however, was not economical of ground space, and it was difficult to get the men to use the pulverized earth as directed. Several other plans were tried, one being a deep trench, narrow at the top, over which are fixed at intervals wooden box seats with covered



FLY-PROOF DEEP TRENCH LATRINE.

openings, the covers being made self-closing; the spaces between the boxes being covered with short pieces of plank. In winter these are covered with light movable sheds made by the regimental pioneers. The seats are washed and cresol solution and chloride of lime is sprinkled in the trench daily. When filled to within a foot of the surface the rest of the trench is filled with earth.

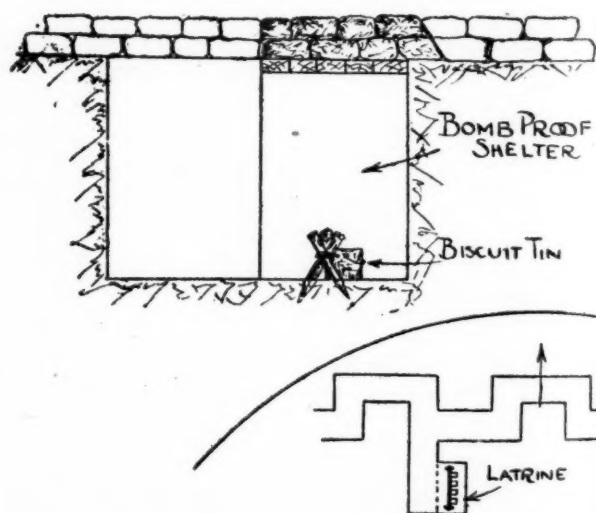
In town and village areas the bucket system of latrines is used, the excreta collected daily and buried in deep pits or burned with the refuse in incinerators. Latrines are arranged to serve as many billets as possible. As a temporary arrangement, until other materials are obtainable, the open bucket latrine is used, consisting of a pole seat and a row of buckets or biscuit tins. Strainers (A)



OPEN BUCKET LATRINE—FRONT AND END VIEWS.

made from perforated biscuit tins are sometimes used in these buckets to keep the excreta separate from the urine for incineration. In a better form, the biscuit tin is covered with a wooden box and fly-proof cover. If it is intended to bury the excreta, cresol solution is placed in the buckets after emptying; but if they are to be burned, straw or sawdust is used. In winter these are placed under sheds or an out-building or light sheds are made by the regimental pioneers.

If sufficient ground is available near billets, soakage urinals are constructed. These consist of pits about 4 ft. deep partly filled with burnt tin cans, bricks, etc. on which the earth has been thrown back lightly, leaving a groove or gutter at one side to allow the urine to drain to the bottom of the pit from biscuit tins fixed above the gutter about 18 inches above the ground and perforated at the bottom.



VERTICAL SECTION OF TRENCH LATRINE, AND SKETCH SHOWING LOCATION.

In the trenches the matter of latrines and urinals presents the additional difficulty of limited space and greater risk of nuisance. The latrine is situated in a bomb-proof shelter excavated at one side of the trench. The deep trench latrine with fly-proof covers and the covered soakage urinal are used where practicable; but where not, the bucket latrine is used, cresol being placed in the buckets before use, and the contents buried behind the trenches at night.

(To be concluded.)

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Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send Municipal Journal regularly their annual and special reports.

Information Bureau.

Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

SANITATION IN ARMY CAMPS.

Hundreds of thousands of our young men are to live for weeks and months, beginning next September, in large temporary and hastily constructed cities—each of these cities larger than any to be found in eight of the states of the Union—training for the European war. Sad experiences the world over have shown that such temporary encampments offer most favorable conditions for the originating and spread of contagious diseases, and the people have a right to demand that the most effective precautions known shall be taken by the government to safeguard the health of the men entrusted to its care. Many will probably lose their lives in battle, but those to whom they were dear will be consoled by the thought that in doing so they were being of real service to their country. But when a soldier dies in camp of disease, his loss does not benefit his country and his relatives are denied the consolation of that thought; while the country loses the investment it has made in training him.

That there will be any epidemics in these training camps we have little fear. Surgeon General Gorgas is one of the greatest sanitarians in the world; and if our army engineers were able to redeem the Panama Canal zone from a pest-hole of yellow fever and other communicable diseases to a health resort with one of the lowest death rates on earth, they certainly should be able to keep in the most sanitary conditions these camps which will have no past to live down.

But when the army reaches the other side, conditions will not be so favorable. Camps can not always be prepared beforehand, for the very good reason that the enemy may hold the ground up to a few hours before our boys encamp upon it. Sewers can not be laid nor wells driven, and yet thousands of men must be provided for in a few

hours' time. Here the native inventive genius of the American engineer must come into play, to secure results with the materials at hand and even in the apparent absence of all materials. The armies of our Allies have not always been entirely successful in preventing disease among their soldiers. More or less serious epidemics have broken out in every army in Europe; but in the Western armies they have been checked very easily and few have gotten in any way out of hand. With the experience that the English and French armies have acquired during the past two years to draw upon, and the possible improvements that it can make upon them, our army can, it is hoped, avoid or quickly crush out epidemics of any and all kinds.

We expect to keep our readers informed concerning the methods employed by our army in securing sanitation. Meantime, we publish in this week's issue and the next a description of some of the details worked out by the British army and employed by it last year in France.

CLEANING SIDEWALKS.

Abstracts of reports concerning street cleaning activities during 1916 in New York and Philadelphia are presented in last week's issue and this week's, and many points of similarity may be found in them. For example, each department has designed a special metal, motor-driven, refuse collecting truck. Also, each calls attention to the importance of cleaning sidewalks. In Mr. Featherston's report it is stated that unclean sidewalks are more often responsible for the impression that the streets are not clean than is the condition of the roadways, the Department of Street Cleaning having no jurisdiction over the sidewalks. Mr. Connell says: "One of the greatest sources of untidy conditions lies in the fact that the city only cleans the paved areas of the streets, while the property owners are supposed to clean the sidewalks."

The sidewalks occupy about 40 per cent of most streets, and are as much public property as are the roadways. We therefore can see no reason why they should not receive as much attention from the street cleaning department as the roadway. The same idea has been expressed by us editorially several times in the past, and we are glad to see it endorsed in theory by two of the leading street cleaning officials of the country. It has already been put into practice by several cities, and we believe that many others would find it to their advantage to do likewise.

PERMANENCY IN ROAD WORK.

The state highway commissioner of Pennsylvania, Frank B. Black, said recently: "We are inclined to believe that cement should enter into the foundation of every road, as in the construction of the more permanent types of wearing surfaces such as brick, concrete and bituminous concrete, it is very essential that the foundation be of an unyielding character, such as concrete. I think that the construction of waterbound macadam roads should be abandoned entirely, especially on main arterial routes."

Possibly not all will agree with Mr. Black in the last statement; but there seems to be a drift of opinion toward the belief that bituminous concrete should be placed on a concrete base, probably due to the rapid increase in number and weight of heavy motor vehicles using such roads. Certainly we have seen during the past two springs increasing numbers of bituminous roads that have gone all to pieces in spots, rutting like soft clay roads, because their bases were just that. Thorough drainage would probably prevent this, but it is a question whether more certain results can not be obtained at no greater cost by use of concrete bases.

RECENT PROGRESS IN WATER SUPPLY

Advance Made in the Past Decade in Improving the Quality—Evolution of Pumping Machinery—Consumption and Metering.

The pioneer water works plants in the United States were first put in operation about 100 years ago, and since that time the remarkable concentration of the country's population in cities has led more or less directly to great progress in the growth and development of water supply systems.

During the first half or three quarters of the century, the principal idea in water works construction was to obtain sufficient quantity; but quality of water is now recognized as of even greater importance. In the attempt to eliminate turbidity and secure more uniformly potable and safe water, the larger cities on the Great Lakes have extended their intakes further from the shores and into greater depths of water. With the increasing pollution of the Lakes, however, and the growing demand for pure, clear water at all times, the tendency is toward filtration of the lake supplies and this has been adopted by many of the smaller cities. The supplies of the more important river cities also have been greatly improved during the past decade, in most cases by the introduction of filtration.

The most notable water supply developments recently constructed or under way, however, are furnishing impounded or gravity supplies, these including the new supplies for New York, Los Angeles and San Francisco. New York is just about completing an additional supply of 200,000,000 gallons per day from the Catskills, at a cost of about \$200,000,000, which supply will be capable of further enlargement to allow twice the amount. Los Angeles has just completed the conduit for bringing the Owens river supply a distance of 250 miles at a cost of \$24,500,000, making 259,000,000 gallons per day available in a locality where water is more scarce and more valuable than in any other thickly settled part of this country. San Francisco is building works to develop a supply of 240,000,000 gallons per day by storage in the Hetch-Hetchy valley, 175 miles distant, which supply is estimated to cost about \$37,000,000.

Ground water supplies have been extensively developed during recent years, but mainly by the smaller inland cities. Sometimes there has been practically no alternative source, but in other cases ground water has been adopted to supplement other supplies, in preference to a polluted river supply which would require filtration.

A modern example of one of the largest ground water supply developments is presented by Des Moines, Iowa, which is able to develop an ample supply by means of infiltration galleries in the sand and gravel deposits of a nearby river. It is now well recognized that deep well supplies are not always well adapted to progressive enlargement to meet the growing needs of a town, but ground water supply will continue to be a valuable asset to many small cities situated in certain well recognized zones favorable to a development of such sources of supply.

SANITARY QUALITY OF WATER.

The most notable recent advance in the art of water supply has been the improvement in matters of water purification. The quality of water supplied to consumers has, practically within the last 15 years, been raised to a high standard of purity and safety, mainly by filtration and sterilization. Today it is the exceptional water works

that does not provide a safe, clear and practically colorless water. This has resulted in a great reduction in the typhoid rate, it being calculated that in the 33 cities of over 100,000 population the annual typhoid fever death rate has been reduced by 2,600. It is evident that if the whole country be considered, the saving in life has been much greater than this from typhoid fever alone; and there is good evidence to show that the death rate from other causes also has been materially reduced by filtration. In 1904 the population supplied with filtered water totaled 3,160,000, while 10 years later it had increased to 17,291,000. As late as 1903 only 60 cities and towns were supplied with filtered water, while there are now some 480 filter plants in the country with a total capacity of 2,585,000,000 gallons per day, serving 40.86% of the urban population.

The relative growth of slow sand and rapid sand filtration during this period is interesting. Although slow sand filters were the first to be introduced, by 1904 the rapid sand filters were serving 2,600,000 population, as against 560,000 supplied by slow sand filters; while in 1914 a population of 5,398,000 received water from 30 slow sand filters, but upwards of 450 rapid filters supplied a total population of 11,893,000. The largest slow sand filter is located at Philadelphia, where it has been in service since 1908 with a rated capacity of 240,000,000 gallons per day. A rapid sand filter of 160,000,000 capacity has recently been completed for St. Louis. At Cleveland two rapid sand filters are proposed with a combined capacity of 225,000,000 gallons, one of which is now about ready for service with about 150,000,000 gallons capacity; and Baltimore has a new rapid sand filter of 128,000,000 gallons capacity.

The rapid sand filter has outstripped the slow sand filter principally because it is better adapted to handling waters of the high turbidity characteristic at times of practically all our rivers outside the extreme northeastern portion of the United States. In many parts of the country the slow sand filter, unaided by auxiliary processes (more especially coagulation and preliminary sedimentation), would be incapable of continuously handling the water except at greatly reduced rates of filtration, owing to rapid clogging of the basis of beds and great difficulty and time required in cleaning. On the other hand, the rapid sand filter, using coagulation and ample preliminary sedimentation that relieve the filter of a large share of the burden of purification, and with the ease of cleaning the beds, has rapidly demonstrated its ability to properly and economically filter the most turbid waters. In the cases of New York City, Baltimore and Minneapolis, engineers have reversed earlier recommendations for slow sand filters by recommending rapid sand filters instead.

Recent attempts to apply slow sand filtration outside of its proper zone of relatively clear, natural waters have not met with success, but have brought about certain radical departures from the early slow sand filtration practice that have obscured the original sharp distinction between the two types without evolving a superior filtration. For instance, coagulation has been used at the Washington slow sand plant, in spite of very long preliminary sedimentation; and at Philadelphia and Albany, preliminary filters which are practically rapid sand filters have been added to better enable the slow filters to perform the service expected of them. At Pittsburgh also, extensive modifications have been necessary to properly prepare the water for the slow sand filters that had proved themselves incapable of producing a satisfactory effluent. The reliance now placed on sterilization of the filtered water at most of the principal slow sand filter plants shows further the wide departure

*Abstract of a paper by John W. Alvord before the American Water Works Association.

made from the original slow sand process in the effort to keep satisfactory the performance of some of the plants. All of these additions are foreign to the original idea of a "natural" process for water purification, which gave to the slow sand filter much of its vogue and was used as the principal argument in competing with the so-called "mechanical" filters.

Rapid sand filters have undergone little change in construction and operation during the past ten years, beyond the addition of sterilization as a further safeguard, but follow closely the lines of the modern type first constructed at Little Falls, N. J., in 1902.

As water consumption increases and filter plants are outgrown, there is a tendency to operate them at greater than safe rates. Also there has developed an overconfidence in filtration as a preventive of disease, and a disposition to filter badly polluted waters rather than secure less polluted ones at more expense from distant sources. It is not a proper or a wise policy to overload water filters by using such polluted waters.

The calcium hypochlorite process of water sterilization is the most important single contribution to the art of water purification in recent years. Many water-borne typhoid epidemics have been controlled by this means and some very remarkable results secured in the reduction of typhoid death rates. Radical improvement in sterilization methods was made in 1910 by the introduction of liquid chlorine, which has practically supplanted the hypochlorite process, and by overcoming some of the objections to it has further extended the field of water sterilization. It should not be overlooked, however, that this process does not displace filtration of water containing more or less suspended matter; it can not make a dirty water clean or wholesome.

Decline in Typhoid Fever Death Rate in Eight Cities Following the Use of Hypochlorite Disinfection of the Water Supply.*

City.	Period.	Before	After	Reduction in Death Rate.	
		(Using Hypo.)	(Using Hypo.)		
		Death Rate per 100,000.	Death Rate per 100,000.		
Baltimore.....	1900-10	35.2	1912-13	22.8	35%
Cleveland.....	1900-10	35.5	1912-13	10.0	72%
Des Moines.....	1905-10	22.7	1911-13	13.4	41%
Erie.....	1900-10	38.7	1912-13	13.5	65%
Evanston.....	1907-10	26.0	1912-13	14.5	44%
Jersey City.....	1900-07	18.7	1909-13	9.3	50%
Kansas City.....	1900-10	42.5	1911-13	20.0	53%
Omaha.....	1900-09	22.5	1911-13	11.8	47%
Poughkeepsie....	1900-08	54	1908-13	18.5	65.8%

*Taken in part from paper by C. A. Jennings, "Hypochlorite Treatment Now Firmly Established."

We are safe in concluding that disinfection has come to stay, even though the disinfecting agent may be changed in the future by the further improvement of processes now known, or the discovery of new ones. The ozone and violet ray processes of water sterilization have been exploited to a very limited extent in this country. They have not yet found application on a commercial scale in any of our important public water supplies, and it does not appear likely that they will soon, if at all, displace the liquid chlorine process.

EVOLUTION OF PUMPING MACHINERY.

The apparently secure place occupied a few years ago by the cross-compound, high-duty reciprocating pump is today challenged by the turbo-centrifugal pump.

Until very recently the vertical triple expansion reciprocating pumping engine was preeminent for high service pumping under continuous operation where capacities ranging from 10 million to 30 million gallons per day were required. This type of engine was highly developed over a decade ago and has undergone comparatively little further improvement in the last ten years. It seems that the limit of its performance has practically

been reached at 185 million foot pounds per 1,000 pounds of dry saturated steam. The use of super-heated steam has raised the attainable duty limit to slightly above 300 million foot pounds per 1,000 pounds steam, although the duties are not comparable on this basis. The introduction of superheated steam has not become general even in the larger plants, though it represents the principal recent advance made in improving the performance of this type of pump.

Until recently, for the smaller capacities required in high service units ranging from 2,000,000 to 10,000,000 gallons per day, the horizontal, cross-compound, crank and fly wheel, condensing, pumping engine has had a practically undisputed field in water works service. These machines have a duty range of from 110 to 145 million foot pounds per 1,000 pounds of dry steam and have very generally superseded the direct-acting non-rotative pumping engines formerly used. This type, like the triple-expansion pumping engine, was so far perfected ten years or more ago that but slight improvement has since been made in its efficiency. Both the vertical compound and the horizontal direct-acting, non-rotative, triple-expansion pumping engine are still in the field, but less generally used in water works service than the cross-compound pumping engine and the vertical triple.

Great strides have been made in the last two or three years in improving the efficiency of the turbo-centrifugal pump, which until recently was useful in water works service mainly for low lifts, or as reserve machinery for peak load and fire service. The efficiencies now attainable with this type of machinery greatly extend its field of usefulness in water works practice and promise to make the various types of reciprocating pumps obsolete in the near future. Centrifugal units are now being built with duty guarantees equal to those of high duty, cross-compound pumping engines operating under the same conditions. On the basis of equal duties the advantage of first cost and compactness is in favor of the centrifugal pump.

Although the record duty so far obtained with centrifugal pumps in water works service, 164 million foot pounds per 1,000 pounds dry steam, is still considerably below the best vertical triple expansion pumping engine duty records, the smaller first cost of the turbo-centrifugal unit gives it the advantage over the older type of machinery. There is little question but that the present tendency is toward a very considerable invasion of the water works pumping field by the latest types of high duty centrifugal pumps.

Gas driven pumps have had only rather limited application to municipal water works service in this country and there does not appear to be any marked tendency to increase the use of this type of machinery on a large scale.

Interesting developments have been made since 1900 in means for the withdrawal of water from tubular wells, not only for ground water but for deep well supplies. Following the first notable installation of tubular well centrifugals at Petrograd, Russia, in 1900, self-balancing centrifugals of small diameter in multiple were successfully made and tested at the Clearing Yards in Chicago in 1902, with efficiencies of about 50%. Installations at La Grange, Ill., Waterloo, Ia., and Milwaukee followed, and this type of pump, while not having a wide field to fill, has proved itself useful where needed. A recent installation at Rockford, Ill., includes not only tubular deep-well centrifugals in multiple, but is augmented by series centrifugals at the surface of the ground, delivering the well water under city pressure directly into the city distribution system. Notable experience with tubu-

lar well centrifugals has been had in a number of suburbs of Chicago, at Memphis, Tenn., and Winnipeg, Canada, and elsewhere.

THE DISTRIBUTION SYSTEM.

Some of the worst conflagrations of the past decade followed water pipe breaks that resulted in failure of fire protection at a critical time. To increase the factor of safety in water distribution, some cities have provided cisterns at different points where there is danger of breaks in the distribution system. The need of having duplicate supply mains or conduits, and the importance of providing for promptly isolating parts of the distribution system by valves always accessible and quickly found, and other precautions, are more fully recognized than formerly.

No notable change in the material of distribution pipes and accessories has taken place in recent years, but much more attention is being given to clean interior surfaces, and means for maintaining such are better known and utilized. Of special interest has been the ingenious development of making large connections and inserting valves without shutting off the flow of water.

Cast iron pipes of 16-foot lengths are now manufactured and available, and the joints of cast iron pipe have received much attention, but without so far seriously displacing the standard practice of using lead.

CONSUMPTION.

Even allowing for a somewhat more liberal legitimate domestic use of water in this country, it is difficult to reconcile rates of 100 gallons to 400 gallons per day here with the rates of 25 gallons to a maximum of 70 gallons in Great Britain. Explanation is to be found mainly in leakage and lavish and careless use and waste on the part of the consumer. This has been demonstrated repeatedly in recent years by thorough investigations, by successful campaigns to reduce waste, by water waste surveys, and by wide experience with metering. Several cities have carried on systematic waste surveys and prevention campaigns with beneficial results. Waste surveys in Chicago not long ago revealed an astonishing amount of leakage and led to the detection of entirely unsuspected sources of waste. Ingenious devices have been developed for measuring and checking the flow of water in distribution mains.

Unintelligent opposition still stands in the way of metering in such important cities as Chicago and Buffalo, and in many smaller cities where the present apparent per capita water consumption is altogether unreasonable. The possibilities of economy of water in such cities are best indicated by the prevailing low rates of consumption in those cities that have adopted metering, such as Cleveland, Milwaukee, Hartford, Des Moines, and many others. A few examples (of which York, Pa., is a striking instance) of moderate water consumption although practically unmetered, are to be considered as exceptions rather than an argument for unmetered services.

Comparison of Percentage of Metered Services at Different Periods in 82 Large American Cities.*

Present Services Metered.	1900		1906-12†	
	No. of Cities.	Total Population.	Cities.	Total Population.
100%	1	32,700	7	660,300
75-100%	13	848,700	21	2,818,900
50-75%	5	509,300	12	1,004,000
25-50%	15	1,221,200	14	1,718,600
10-25%	9	636,300	10	2,047,100
0-10%	39	11,513,500**	18	11,569,300††
Total & averages	82	14,761,700	82	19,872,200

*These cities were all over 25,000 population in 1900. †The data in this column was obtained for various years from 1906 to 1912, inclusive, most of it being for the years 1910, 1911 or 1912. **Includes New York and one other city reported as having no meters. ††Includes New York and six other cities reported as having no meters.

GENERAL.

Nearly all of the states now have established public utility commissions having more or less power to regulate rates, require uniform accounting, and value property developed to the public use. These subjects are admittedly difficult and complicated and are now being extensively studied.

During the past decade the transfer of water supply utilities to municipal ownership has continued, though less rapidly than in prior years as the number of privately owned plants diminishes. Approximately \$15,000,000 in value of private utility property in water supply has become municipally owned since 1905 in the United States, and several large properties yet remaining in private hands will undoubtedly be transferred to the public control at an early day.

It is apparent that more attention is to be given to the

Duty Performances of Vertical Triple Expansion Pumping Engines.

No.	Capacity in gals. per 24 hours.	Piston speed in feet.	Head		Steam pressure in pounds.	Indicated horse power.	Percentage of mechanical efficiency.	Steam per I. H. P. hour.	B. T. U. per I. H. P. minute.	Duty in ft. pounds per 1,000,000 B. T. U.	Duty in ft. pounds per 1,000 lbs. steam.	Per cent. of thermal efficiency.
			Feet.	Pounds.								
1	15,000,000	197	292	126	126	802	96.8	10.68	202	158,077,320	179,454,250	21.00
2	30,000,000	195	140	61	185	748	93.3	10.33	196	163,925,300	178,497,000	21.63
3	15,000,000	197	293	126.8	135	796	97.7	10.88	205.2	156,900,000	177,200,000	20.67
4	12,000,000	203.6	334.75	145.2	176.67	...	...	...	...	...	181,433,826	...
5	12,000,000	221.4	322.21	139.8	153.56	...	...	...	...	...	182,281,000	...
6	20,000,000	239.04	385	167	...	...	...	...	...	...	184,700,000	...
7	12,000,000	204.2	279	121	...	618	97.1	10.82	209	151,000,000	175,400,000	20.25
8	20,000,000	221.43	220.85	95.9	180.19	...	...	...	...	163,330,000	184,476,000	...
9	30,000,000	248	140	61	151.4	811	93.1	10.72	...	154,600,000	171,700,000	19.86
10	30,000,000	248	140	61	148.9	806.3	93.9	9.55	...	163,000,000	194,403,500	21.99
11	7,000,000	200.69	441.08	191.5	160.4	574.83	97.63	9.597	...	...	201,662,445**	...

*163° superheat. **100° superheat.

Builder or Designer.	Date of Test.	Location of Engine.
1 Edw. P. Allis Co.....	1900	St. Louis, Mo., No. 10.
2 Edw. P. Allis Co.....	1900	Boston, Mass (Chestnut Hill).
3 Edw. P. Allis Co.....	1903	St. Louis, Mo., No. 12.
4 Allis-Chalmers	1906	Milford, N. J.
5 Holly	1909	Albany, N. Y.
6 Allis-Chalmers	1909	Nashville, Tenn.
7 Allis-Chalmers	1910	Milwaukee, Wis.
8 Holly	1910	Philadelphia, Pa.
9 Camden Iron Works...	1908	Cincinnati, Ohio.
10 Camden Iron Works...	1908	Cincinnati, Ohio.
11 Bethlehem Steel Co....	1914	Pittsburgh, Pa. (Mission St. Station).

conservation of our available supplies and to protecting them from contamination. This movement has already begun in the studies of the Great Lakes, the sanitary survey of the Ohio river and the valuable and earnest work of the state water surveys now in progress in many states over the country.

New and revolutionary discoveries are always possible in any art, but without discussing these opportunities for betterment it is easily to be seen that we have

yet a great deal to do to organize, systematize and standardize the problem of public water supplies of this country in the next few years.

WATERWORKS PROPERTY EXEMPT FROM TAXATION.

The library of the State of New York has recently collected data on laws in the various states regarding property exempt from taxation. Municipal waterworks plants are exempt as follows:

Illinois: All works, machinery and fixtures belonging exclusively to any town, village or city and used exclusively for conveying water to such municipalities.

Kansas: All works and machinery owned by any municipality and used exclusively for conveying water thereto.

Maine: Aqueducts and fixtures of any corporation supplying a town with water for fire purposes without charge. Exemption does not extend to capital stock or real or personal property of corporation.

Ohio: Plant and fixtures belonging to a city or village and used exclusively for conveying water to it or for heating or lighting it.

Rhode Island: Municipality may exempt pipes and reservoirs and the land and works therewith connected from taxation.

Texas: All works, machinery or fixtures belonging to any town and used for conveying water to such town.

Vermont: Municipal electric light plants when located outside the town wherein the municipality owning the same is situated shall not be exempt.

The laws in regard to exemption of water power or similar plants are as follows:

Alabama: Hydro-electric plants for the production and distribution of electricity, exempt for 10 years. Plants already developed not exempt. Calcium cyanid plants also exempt for ten years except as to lands.

Arkansas: All works, machinery and fixtures owned by town and used exclusively for conveying water thereto.

California: Rights of way and other property belonging to any irrigation district shall not be taxed for state and county or municipal purposes.

Colorado: Property of drainage district exempt. Also ditches, canals and flumes used for irrigating lands, if water is not sold for the purpose of deriving a revenue therefrom.

Connecticut: Land owned or taken by a municipality for water supply purposes shall be exempt from taxation provided the inhabitants of the town in which the land is located have the right to the use of and do actually use such water.

Idaho: Irrigation canals and ditches and the water rights thereto when no water is sold or rented from any such canal or ditch and is used only to irrigate lands in this state.

Illinois: All works, machinery and fixtures of drainage districts, when used exclusively for pumping water from the ditches and drains of such district.

New Hampshire: Improvement caused by reclaiming swamp or swale lands for purposes of agriculture exempt for ten years.

New Mexico: Irrigation ditches, canals and flumes belonging to communities and used exclusively for irrigating lands without charge for water shall be exempt. All irrigation ditches, canals and reservoirs used for storing or conducting water for irrigation purposes shall be exempt for a period of six years from the commencement of construction.

Oklahoma: Any water users' association authorized to furnish water only to its stockholders shall be exempt from the payment of any incorporation and any annual franchise tax. Any corporation successfully bringing to the surface the "underflow" waters for irrigation purposes shall have all personal property owned or used in such development exempt from taxation for period of five years. Municipality may exempt for five years like corporation developing gravity underflow water plants.

Utah: Ditches, canals and flumes, owned and used exclusively for irrigating lands owned by individuals or corporations or its individual members.

SUMMER SCHOOL IN ENGINEERING.

The nineteenth annual Summer Session of the College of Engineering of the University of Wisconsin will be held at Madison during the six weeks' period beginning June 25, 1917.

Special courses will be given in chemistry; electrical, steam, and hydraulic engineering; gas engines; machine

design; mechanical drawing; mechanics, shop work, and surveying. All courses given in the University Summer Session are open to engineering students. Special courses have been arranged for engineering, manual arts, and vocational teachers.

Further information can be obtained from F. E. Turneaure, Dean of the College of Engineering.

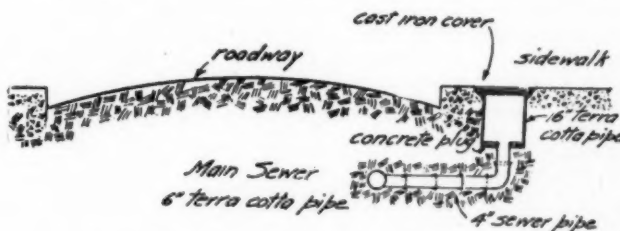
SEWERING A SMALL COMMUNITY.

Petersburg, W. Va., is a small community having a population in 1910 of about 500 and at present of something less than 1,000 inhabitants. It appears, therefore, that although small, it is growing very rapidly. It is situated in a broad, open valley and depends largely upon agricultural interests for its existence. During the fall of 1914 both water supply and the sewerage system were installed and since then a privately owned electric light plant has been built.

The sewerage system is of interest because of its simplicity and the small size of pipe used in its construction. The following description is given in the latest report of the State Board of Health of West Virginia; the engineer of the board, Mayo Tolman, stating that up to the time of his visit no trouble had been experienced with the system.

Perhaps the most interesting feature of this system is the smallness of the pipe used. The largest size is 8-inch, of which there are 30 feet from the foot of the main street to the tail race of a mill into which the sewage is discharged. The remaining part of the system consists of 3,620 feet of 6-inch vitrified pipe and 2,350 feet of 4-inch vitrified pipe. The system was laid without any manhole in the line, so that there is no opportunity to run any form of scraper or cleaning iron through the sewer.

Portions of the sewer have been laid on very flat grades, and in order to provide against the danger of clogging, a system of openings for flushing has been provided that are perhaps unique. These flush manholes, as they are called on the plans, are eight in number and are constructed as shown by the accompanying sketch. A 16-inch vitrified pipe is set vertically below the sidewalk with its bell end up and flush with the sidewalk surface. A short length of 4-inch vitrified pipe set vertical, is firmly cemented into the center of the bottom of the 16-inch pipe, concrete being used for the construc-



FLUSH MANHOLE IN PETERSBURG.

tion of this bottom. At the bottom end of this 4-inch pipe is a 90 degree bend and the further end of this is connected by 4-inch pipe to the main sewer. Flushing is accomplished by pushing a fire hose into the 4-inch pipe and allowing a stream of water from the nearest fire hydrant to rush into the sewer under good pressure. The vertical 16-inch pipe is covered on the top with a cast iron cover that rests on the shoulder of the bell. Apparently this serves the purpose, for the present at least, since the representative of the state board reported, as stated above, that the system had given no trouble.

The WEEK'S NEWS

Road Progress in Illinois, New York, Oregon and Oklahoma—Reorganizing Connecticut's State Health Department—Important Step in Wanaque Watershed Development—Akron Votes to Improve Its Waterworks—New York's New Police Bureau—San Antonio Turns Down Charter Amendments—Self-Assessment in Ohio Reported Success—Less Refuse Here and in England for Economy—The State Housing Experiment in Massachusetts—Waterfront Development in Baltimore.

ROADS AND PAVEMENTS

Reorganizing State Work in Illinois.

Springfield, Ill.—The state, since its admission to the Union, has been administered largely by boards wholly independent of each other, of which there are now 126. On July 1, however, they will be consolidated into nine general state departments. This experiment will be watched with much interest, particularly the extent to which the cost of the work can be reduced without decreasing its efficiency or its quality increased without adding to the present cost. So far as the highway work is concerned, the general direction will be transferred from the present state highway commission to the director of the department of public works and buildings, who will also have charge of the state architectural work, its buildings, waterways, parks, and printing, and act as purchasing agent for the state. The immediate charge of the road work will be given to a superintendent of highways and a chief highway engineer; in addition there will be an unpaid board of five highway advisors, whose sole function is to advise with the department officials upon request.

Improve Road Oiling Methods.

Albany, N. Y.—The inconvenience due to the slippery condition of a recently oiled road can be greatly reduced, according to Fred W. Sarr, second deputy highway commissioner of New York. The experience last year in that state proves that the time a road remains objectionable from a traffic standpoint can be reduced from one-half to three-fourths at an additional cost of only about \$25 per mile. This is done by a slight change in the character of the road oil. Experience during several years seems to indicate that the best road oil for light surface treatment in that state contains about 65 per cent of asphaltum or pitch and must be heated to a temperature of about 100 degrees in order to be sprayed successfully on the road, except during very hot weather. The improvement in treatment lies in an alteration in the character of the material used to flux the asphaltum or pitch base. This flux is now required to have about 50 per cent of light volatile oils which will evaporate in about two days after the surface application is made leaving the roadway free from the objectionable conditions.

Vote \$6,000,000 for Oregon Highways.

Salem, Ore.—The road bond measure, which assures an appropriation of \$6,000,000 for a system of highways, has been carried by a statewide majority of over 17,000. The vote in Multnomah County, which is the only one which will receive no direct benefit from the measure, was a majority of over 19,000. As soon as favorable outcome was assured by the count the state highway commission ordered twenty miles of road-building as a beginning of the program. The first ten miles will be on the road from Pendleton east over the route leading to Walla Walla. The second ten miles will be on the Rex-Tigard road, between Tigard and Newberg. This action was taken on condition that the respective counties immediately prepare the grade for receiving hard surfacing. With the adoption of the road bonds by the people, Oregon will now have a comprehensive and constructive road program. Within a few years it is expected that the state will have several hundred miles of hard surfaced roads, in addition to a network of post and forest roads, the latter paid for in part by the appropriation from the federal government. There had

been considerable opposition to the bond issue and the state department is particularly pleased with the promise of future opportunity.

Publicity Bureau for Road Department.

Oklahoma City, Okla.—The state highway department has organized a bureau of publicity, under the charge of one of the oldest journalists of the state, T. F. Hensley. The state and federal funds for road building during the next five years are estimated at about \$8,000,000, and in addition there will be a large expenditure for local road improvements. In order to obtain the greatest returns from the money it is necessary for the state and local road builders to work in harmony and for the public to understand what is being done and why. The object of the bureau of publicity is to furnish to county officials, newspapers and others interested in highway improvements the information which they require for this cooperative endeavor.

SEWERAGE AND SANITATION

Connecticut State Health Work Reorganized.

Hartford, Conn.—The legislature has passed an act abolishing the state board of health and creating a state department of health with additional duties and increased powers. The board has long felt the need of more power and money. The demands on the board have in recent years increased enormously, so that meetings have been voluntarily held monthly instead of quarterly as required by law. The new department is to consist of a commissioner of health and a public health council, with bureaus in charge of directors. By July 1 the governor is to appoint a commissioner of health and six members of the council.

The commissioner of health is to be the administrative head of the department and chairman of the public health council. He must be a physician, "graduated by an incorporated medical college recognized by one of the medical examining boards of this state, of at least five years' experience in actual practice of his profession, skilled in sanitary science and experienced in public health administration." The term of office of the commissioner of health will be six years from the first day of July following his appointment. He must not engage in any other occupation, and will be paid a salary of \$4,000 per annum, and the expenses incurred in the performance of his duties. Of the six members of the council, at least two must be physicians, and two sanitary engineers. Two members will hold office from their appointment until the first day of July, 1919, two until the first day of July, 1921, and two until the first day of July, 1923. The terms of office of members appointed in 1919 and biennially thereafter will be six years from the first day of July following their appointment. The governor will fill any vacancy. Members of the public health council will be paid their actual and necessary expenses incurred in the performance of official duties. The council is to meet at least once in three months, and at such other times as it shall determine or upon request of any four members, or of the commissioner of health. Four members of the council, including the commissioner of health, shall constitute a quorum. The council is to establish a sanitary code, and from time to time amend it and make regulations. The council has authority to prescribe the qualifications of the directors of bureaus and all other appointees and must submit biennially to the governor a report with recommendations.

The commissioner "shall administer the laws and the code, prepare rules and regulations for the council and, with the approval of the council, appoint and remove directors of bureaus, deputies, inspectors and other employees. He shall have authority over health officials, and may for cause, and with the consent of the council, remove any local health official, but any person claiming to be aggrieved by such removal may appeal to the Superior Court; he shall assist and advise local health officers in

the performance of their duties, and may require the enforcement of any law, regulation or ordinance relating to public health, and, with the health authorities of this and other states secure information and data concerning the prevention and control of epidemics and conditions affecting or endangering the public health, and he shall compile such information and statistics and shall disseminate, among health authorities and the people of the state, such information as may be of value to them. He shall prepare printed forms for reports and returns, and such instructions as may be necessary for the use of health officers, boards of health and registrars. When requested by local health officers, he shall visit their jurisdictions to investigate, consult and advise on any condition affecting public health; make, at least once each year, an inspection of all public hospitals, asylums, prisons, schools and other institutions and submit a report of his investigations to the council with such recommendations as he may deem proper. The commissioner of health shall investigate complaints of nuisances and conditions affecting the security of life and health in any locality, and for that purpose, he or any person authorized by him so to do, may enter and examine any ground, vehicle, apartment, building or place, and any person designated by him shall have the authority conferred by law upon constables." The department is to maintain bureaus of vital statistics, preventable diseases, laboratories and sanitary engineering.

Cities, boroughs or towns may consolidate for the purpose of forming sanitary districts. Such consolidation shall be accomplished in the same manner as consolidations of fire districts, and the appointment of a health officer therein shall be by agreement between the selectmen or the city and borough officials of the municipalities voting to consolidate. If such health officers shall not be selected within sixty days from the consolidation of such district, the health officer shall be appointed by the public health council. Upon the appointment of a health officer under the provisions of this section, the terms of office of the health officers of the towns, cities or boroughs forming such consolidation shall terminate. Any local health officer, board of health, or official charged with the enforcement of the health laws shall enforce or assist in the enforcement of the sanitary code and such rules and regulations as may be adopted by the council. Towns, cities and boroughs shall retain the power to adopt sanitary rules and regulations heretofore granted by statute, provided no rule or regulation hereafter adopted shall be inconsistent with the sanitary code as adopted by the public health council. In any emergency when the health of any locality shall be menaced, or when any local board of health or health officer shall neglect or refuse to comply with the recommendations of the state department of health, said department may enforce such quarantine regulations as may be required for the protection of the public health. County health officers shall prosecute any violation of any provision of this act. Any person who shall violate any provisions of this act or of the sanitary code shall be fined not more than one hundred dollars, or be imprisoned not more than three months, or both.

To Consider Plans for Joint Sewage Disposal.

Trenton, N. J.—Appearing before the state board of health John Milton, counsel for Jersey City, informed the board that in the judgment of George A. Johnson, engineer for the city, the scheme for a general trunk sewer for all municipalities in the Jersey City watershed was not practicable. In view of this decision Mr. Milton informed the board that within a short time Jersey City will call a conference of representatives of Dover, Rockaway, Boonton and Wharton to consider the advisability of constructing a trunk sewer for those municipalities and the erection of a disposal plant below the dam at Boonton for disposition of the effluent. Accepting the proposed action of Jersey City as a definite plan likely to result in a solution of both the sewage problem of Dover and other municipalities and the water problem of Jersey City, the board designated one of its members, Dr. Herbert Spence, to represent it at the conference.

Polluted Watershed Causes Typhoid Epidemic.

Canton, N. C.—Dr. W. S. Rankin, secretary of the State Board of Health, has given out a statement on the recent typhoid epidemic in this town. Canton, in Haywood County, has about 2,000 inhabitants, and since the epidemic started on April 7 there have developed approximately 120 cases of the disease, several of which have terminated fatally. Although precautions have been taken through the inoculation of about 80 per cent of the population and the installation of a hypochlorite plant to disinfect the water supply, the period of incubation is such that it may be yet several days before the epidemic will have run its course.

Canton gets a supply of water from a mountain reservoir through a feed pipe, on the line of which between the reservoir and the town live seven families. Of these five used the water for all purposes, one did not use it for a supply of drinking water, and one did not use it at all. All the five families that used water suffered with the disease, which was the first clear evidence to convict the water. It was in the watershed from which the reservoir is filled that the source of the disease was finally discovered, in the case of a man and wife who had a house in the forks of two streams feeding the reservoir. Investigation discovered that they had suffered with typhoid in November last, and that they moved to the watershed about the middle of March. They probably acted as carriers. On learning of the epidemic Dr. Rankin sent the department's epidemiologist, Dr. Crouch, to Canton, where he gave instructions to the people and posted notices, etc. He was followed by engineer Booker, who, after investigation, recommended the hypochlorite plant which has finally been installed in proper shape after a previous attempt on the part of the local authorities had failed to give satisfaction.

WATER SUPPLY

City Wins in Competition Case.

Norfolk, Va.—The Norfolk County Water company has lost the first move in its fight to prevent the city of Norfolk from supply water to the territory around the site of the proposed municipal docks, to the American Chain Company and to the Jamestown Exposition site, Judge Edmund Waddill, in the United States district court, declining to grant the injunction asked by the company. An appeal will be taken to the United States circuit court. The request for the restraining order was made on the ground of the unconstitutionality of the act of 1916, permitting the city of Norfolk to sell water in the territory supplied by the Norfolk County Water company. The company claimed that this amendment to the city charter was discriminatory in that it did not permit the city to sell water in that portion of Norfolk County supplied by the Portsmouth, Berkley and Suffolk Water company, or by the Portsmouth Suburban Water company. City attorney Pilcher in answer to the bill of complaint replied that no right of the plaintiff had been abridged or violated.

Contract Signed for Wanaque Supply.

Newark, N. J.—A contract has been signed by the city, represented by Mayor Raymond and the board of works, and the North Jersey District Water Supply Commission for the development of the Wanaque watershed. This represents Newark's greatest single undertaking and the cost will be \$8,060,000 for construction and \$72,500 for annual operating expenses. The state commission, which has control of all water supply enterprises, will take charge of the creation of the new shed and enter into contracts for construction, for which Newark will be financially responsible. Steps are now being taken to prepare the data for construction contracts to be awarded as soon as possible and for the acquisition of 2,000 acres in the vicinity of Midvale, Passaic, County, as a site for a huge reservoir. Without legal interference it would take four years to complete the development and thereby increase this city's water supply. An immediate attack in the courts upon this contract is expected, however, this to come from the Society for the Establishment of Useful Manufactures and the Morris Canal interests, both of which will declare their rights in streams to be adversely affected. It was to circumvent these interests by preventing their recourse to the courts on a plea that the contract be not made that the Board of Works and the water commission approved the contract without a final public hearing. By this course, in the opinion of the city authorities, at least two years of legal battle has been avoided. There is pending before the supreme court the application of the society for review of the action of the State Department of Conservation and Development in granting to the water commission the right to divert the waters of the Wanaque. This will be heard in June. A reservoir from which 50,000,000 gallons can be drawn daily will be built on the Wanaque River, near Midvale, to flood at an elevation of 275 feet about 2.2 square miles. The

reservoir will be six miles long and one and a half miles wide at the widest part. The dam will be 1,725 feet long, 1,175 feet of which will be constructed of earth filling with a concrete core wall.

The extent to which Newark is to be reimbursed for its vast outlay is dependent upon the number of other municipalities which decide to take or increase their water supply from the same source. It is expected that Paterson will immediately proceed to acquire its local distribution system by condemnation, and that it may be able to share in the Wanaque undertaking within two years or three at the most. Passaic, which also desires to share in the Wanaque, already has started condemnation proceedings against the Acquackanonk Water company, a subsidiary of the East Jersey Water company. Payment by Newark of the cost of construction will be extended over the four years required for the development. Nothing will be added to the tax levy, however, as the first payment of \$260,000, due thirty days hence, will be made out of the revenues of the city's water department, and the subsequent payments by the water department. Profits of the department are sufficient to permit this with a curtailment of expenditures on the distribution system within this city.

Payments are to be made quarterly, those for the first year being of \$250,000 and totaling, with the initial instalment, \$1,260,000; in the second year, \$1,400,000 will be paid in \$350,000 instalments; the third year, \$2,000,000 will be paid in \$500,000 instalments, and in the fourth year there will be paid \$3,400,000, in \$850,000 instalments.

However, if the amount of money needed to carry on the work is less than the advances scheduled to be made, the water commission may authorize the extension of the payments over a longer period of time. Such interest as accrues from the advances is to be applied for the benefit of Newark in the execution of a contract, and such sums as have been advanced by this city toward preliminary surveys are to be included in the total cost.

The contract provides that the amount of water drawn from Greenwood Lake will be allowed to pass by or through the dam at all times to flow down the river, as it has in the past, to feed the Morris Canal. Newark agrees to take a daily minimum of 10,000,000 gallons and Paterson, when it enters the project, will take the same amount.

The bonds to be issued will be in a serial form, as required by the Pierson bond act, and will run for either thirty or forty years. In addition to paying the interest charges, the funds of the water department will be sufficient to make annual payments on the principal. A possible hiatus in the payments is expected for a period between 1921 and 1922, when the final payment on the principal of the Pequannock watershed bonds will be made, but it is calculated this difficulty can be overcome by temporary bond issues.

In addition, there will be laid 165,000 feet of sixty-inch steel pipe to deliver the water to Newark. Connections with this pipe line will be made when other municipalities desire water.

Studies will be made regarding the advantage of installing hydro-electric power to utilize the surplus water, applying the revenue to reduce the maintenance charge. Perpetual control of the watershed is vested in the North Jersey District Water Supply Commission, which was created to see that all municipalities in this section of the state were treated alike in the use of streams for potable purposes. Its present members are Laurent J. Tonnele, president; Dr. William E. Ramsay, Ernest C. Hinck and George F. Wright.

Votes \$1,000,000 for Waterworks Extensions.

Akron, O.—At a special election a bond issue of \$1,000,000 for extending and improving the water supply system was approved by a vote of 3,166 against 1,235. The vote was exceedingly low because of registration for the Federal draft the day previous. The Akron Chamber of Commerce, through the Bureau of Municipal Research, sent out a bulletin supporting the issue and giving convincing argument for it. The extensions were made urgently necessary by the rapid growth of the city and increased per capita consumption. The filtration plant at Kent has been working at maximum capacity and no extra water could be sent through the mains from the plant. For about a year and a half the city has been almost entirely dependent on one pump for its supply and damage to it for more than a day would have left the city without water. The distribution system was designed for 100,000 population, 25,000 less than the number in the city now. In some parts of the city during the last summer water could not be obtained above the first floor and a fire in that section at the same time as one in the business section would mean grave danger. "It must not be considered that the \$1,000,000 bond issue or even the \$2,550,000 estimated in the report of the department of pub-

lic service as needed immediately, will serve to complete the waterworks; the waterworks and all other public improvements will be completed only when Akron is completed," says the report of the municipal research bureau. "It is not beyond reason to foresee an investment for waterworks totaling \$10,000,000 between now and 1930, and the actual sum required will depend only upon the growth of the city." In addition to Akron's sudden growth, the water question has been aggravated by an attendant increase of 29 per cent. in the per capita demand for water from 1910 to 1916. During 1916 an average of 130 gallons of water per person daily was required. Metering is to be the remedy for this condition. The bond issue is to be used as follows: Enlargement of purification plant by adding 10,000,000 gallons daily capacity, \$200,000; construction of 30-inch main to improve service in certain sections, \$91,000; general extension of small mains, \$500,000; satisfactory service conditions on West Hill, \$42,000; meters, \$50,000; hydrants, \$21,000; engineering and contingencies, 10 per cent, \$90,000—total, \$994,000.

City Buys Water System.

Coalinga, Cal.—The first of the city's newly drilled artesian wells is now furnishing its supply, which is supplementing that obtained from the plant recently purchased by the city. The well is 1,408 feet deep. The first 208 feet is cased with 16-inch pipe, the next 500 feet with 12-inch, and the rest with 5½-inch. Work has been started on another well. The city trustees a few weeks ago purchased the plant of the Pleasant Valley Water company for \$30,000 following a long campaign for municipal ownership. The city acquired the hard and soft water plants, the filters and 3½ miles of pipe lines, and part of the real estate. The company retained buildings and the distilling plant and part of its pipe lines, and continues to do business with private corporations. The company at first asked the city \$48,000 for the whole plant, but the city had already bored its own wells.

City Wins Right to Supply.

Ann Arbor, Mich.—The city's big proposed pumping station, on the marshes three miles south of the city, can be operated for the purpose of taking water for the city's consumption, despite the fact that the taking of the water actually does weaken flowing wells and dormant wells of farmers living nearby. So long as the city does not unreasonably make use of the percolating water in the gravel deposits near the marsh, and does not work injury to the other property owners it can go ahead, but if it does work injury and that injury is apparent, it must pay damages. This is the decision of the supreme court in ruling on attempts of land owners in the marsh where Ann Arbor now gets its water to stop all proceeding with injunctions. The injunctions refused by the circuit court of Washtenaw County are refused by the high court, but at the same time notice is served on the city that it cannot go beyond the bounds of reason and by powerful suction drain nearby wells and injure agricultural land. The Ann Arbor case was one of the most important of its kind ever brought before the court. The testimony in the case showed that the city expects to get 4,000,000 gallons of water by means of high-powered suction pumps in the wells it has sunk.

FIRE AND POLICE

Bureau of Missing Persons.

New York, N. Y.—The Bureau of Missing Persons of the police department has now assumed jurisdiction over cases of missing persons, unidentified dead, insane persons, injured persons, all persons found dead, and children whose parents cannot be located. For this work a detailed set of rules has been laid down for the guidance of the force by commissioner Woods. In obtaining descriptions of persons, policemen are impressed with the importance of the first steps in investigations of this kind. The policeman called in such a case is asked not only to fill in the required blanks, but to add other facts which his intelligence may tell him will be of value in the subsequent establishment of identity. Modern police methods overlook no

clue, and the identity of unknown dead has been found out through the smallest and apparently most insignificant detail. If an unidentified injured person is found, or if a policeman has to report a lost or missing person, the rules require that he obtain an accurate description of the person, and of the wearing apparel, and promptly telephone it to the desk officer at the station house. The latter must report to the Bureau of Missing Persons in Manhattan, and within a very few minutes thereafter the official machinery is put into action. Insane persons, unless already in safe keeping, must be taken to the station house by the policeman to whom the case is reported. The desk officer must call an ambulance, and it is his responsibility to see that the patient is delivered at the hospital and under necessary police guard. The bureau must be notified, and where the identity is not known an alarm sent out. Where a body has been found the first duty of the policeman on the scene is to record in his memorandum book a complete description of the body and clothing. He must also see that no one except an officer from the detective bureau, or a representative of the coroner, or the district attorney disturbs the body or anything around it that might constitute evidence as to the cause of death. Before the body is removed from the station house it is carefully searched under the supervision of the senior officer present and in the presence of a witness. An itemized list of all articles found must be entered in the records. When an inquiry is made at a station house regarding a missing person, the desk officer is instructed to carefully search his records. If no information is contained there he shall make inquiry of the bureau of telegraph as to inquiries. If these are unsuccessful the inquiry shall be forwarded to the missing bureau. By these methods the commissioner believes that the heretofore loose ends of an investigation will be gathered up, and all inquiries and information reach promptly a central point of investigation.

Wants Increased Department.

Akron, O.—Fire chief Mertz, in a recent statement, points out the dangers of the present shortage of men in the fire department. "We now have 82 firemen, who are obliged to keep tab on 25 square miles of territory and over 125,000 people. While most of the men are clamoring for shorter hours, we are not able to grant their request because of lack of funds in the city strong box to hire additional men to relieve them." Mertz says the fire department has the same sized force and equipment at present it had in 1908, when the city had a population of 65,000. With the expansion of territory and the increase in population local firemen with their small force have to be on the job most of the time. Their position is also made more difficult because of the great number of false alarms which are turned in, he said. Mertz stated that if the double platoon system, which is in great favor with most of the men, were established here, it would require nearly 40 more men and an additional outlay of close to \$50,000 a year. Under the

double platoon system the force would be divided into day shifts of 11 hours and into night shifts of 13 hours, while under the present rule the men are off one day in four, but on the three other days they have to be on duty at all times, day and night.

Policewoman Appointed.

Niagara Falls, N. Y.—Miss Ambolena Hooker has been appointed policewoman, according to an announcement by city manager O. E. Carr. Miss Hooker is the daughter of a well-known manufacturer of the city, socially prominent, is twenty-two years old and has had excellent training for the work. She is a Vassar graduate and has worked in the Gannett House settlement. She has had two years' experience in welfare work at the Hooker electric plant, has given a considerable amount of time to the activities of the Protective league and Prohibition society of New York city, and has spent some time at Bedford, studying methods, plans and ideals of the New York State Reformatory for Women. The city manager expects excellent results to follow the appointment.

MOTOR VEHICLES

New Truck in Service.

Trenton, N. J.—The White Horse volunteer fire company is very proud of its new triple combination fire engine, equipped with a 65 horse-power engine and costing \$6,000. The tests demonstrated that the engine, under 120 pounds pressure, could pump 265 gallons per minute through 200 feet of hose, a one-inch nozzle being used, while under 160 pounds of pressure, 310 gallons were pumped. Using one line of hose, 300 feet long, with two ¾-inch tips, under 160 pounds pressure, the machine pumped 418 gallons of water per minute. The automobile carries a 40-gallon chemical tank. It carries 1,000 feet of hose and a basket in which 200 feet of chemical hose can be stored. The White Horse company, while organized only four years, has done exceedingly well. The accompanying illustration shows the new machine.

Apparatus Accepted.

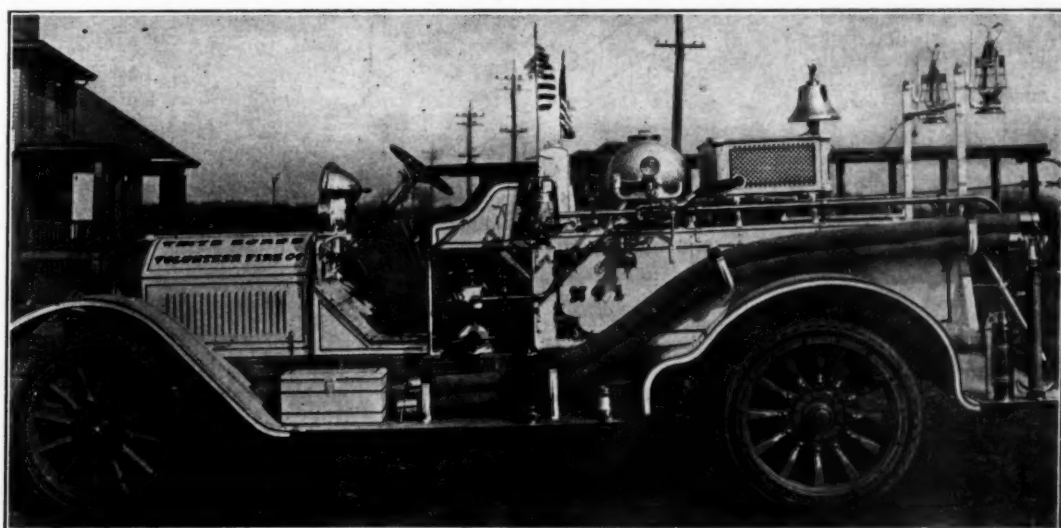
McAlester, Okla.—The new fire apparatus has been formally accepted by the city commissioners. Both chief Holbrook's car and the new hose and chemical truck made excellent time on the test runs up hills. Mayor Wood and commissioners Pittman and Bond rode in the machines in the tests.

New Machine Installed.

Bethlehem, Pa.—The city's new auto apparatus is now in service, following a very successful test. Among those present were councilmen Becker, Wright and Stein, members of the fire committee; president A. M. Rush, fire chief C. E. Bender, Archibald Johnston, R. W. Leibert and J. M. Leibert. The motor pumper was tested at the Monocacy. The apparatus exceeded its contract requirements

NEW TRUCK
OF
WHITE HORSE
FIRE
DEPARTMENT.

Courtesy,
Trenton (N. J.)
Times.



by over 150 gallons per minute. Two single lines of 50 feet of hose from pump, siamesed into two, making four streams, delivered 650 gallons per minute with two one-inch tips and also a 2 $\frac{7}{8}$ -inch tip, with a 60 pound pressure at the nozzle. Two lines of 100 feet of hose with two 1-inch tips threw 590 gallons per minute with a nozzle pressure of 100 pounds and a 175-pound pump pressure. Two single lines siamesed into one with 1 $\frac{3}{4}$ -inch tip delivered 620 gallons per minute with a 60-pound nozzle and a 120-pound pump pressure. With a 1 $\frac{1}{4}$ -inch tip and a 110-pound nozzle and a 140-pound pump pressure, the same line delivered 490 gallons in one minute. The two Brockway combination chemical and hose trucks were subjected to severe hill-climbing tests, all of which were satisfactorily accomplished. The machines were made by the American La France Fire Engine Co., Elmira, N. Y.

GOVERNMENT AND FINANCE

New City Managers Appointed.

Pipestone, Minn.—Pipestone is to have a manager of municipal affairs. He is to act as chief of fire department and chief of police and will have supervision of the other departments, including the waterworks, sewer system and street department. F. E. Cogswell has been named manager.

Willow Lake, S. D.—The city has adopted the city manager plan of conducting municipal affairs. L. F. Reynolds, a leading business man, has just assumed the duties of city manager, having been appointed to the place by the city council at the request of a large majority of the citizens. He will have direct charge of all city activities. He also will act as purchasing agent for the city.

Wages of City Employees Increased.

Duluth, Minn.—City employees in outside work, who are married and supporting families, were given wage increases beginning June 1. Office employees are not affected. Provision is made in the resolutions that these increases are only temporary, being made to assist the married laborers during the present high cost of living, but that the old scale may be adopted arbitrarily, in the event conditions improve. In the public works division drillmen, common laborers, skilled laborers, the superintendent of sewers, assistant foreman and stationary engineer are affected by the change. In water and light department, mechanics, inspectors, firemen, calkers, tappers, shopmen, powder men, skilled and common laborers will receive increases.

Lengthy Charter Amendments Defeated.

San Antonio, Tex.—Following the defeat of the proposed amendments to San Antonio's charter, it is said that it was not the principles embodied in the proposed amendments that encompassed the defeat of the charter revision plan, but the manner in which the proposals were drafted, it being the contention of the so-called anti-revisionists that the principles were lost in a welter of unnecessary and distinctly misleading verbiage. Charges were made that the drafters of the amendments had intentionally been verbose for the purpose of vitiating the desirable features and centralizing authority in the hands of those in office. More than one hundred and fifty typewritten pages were required for the amendments; in words the proposed revision was three times as long as the existing charter, one proposed amendment alone being of equal length with the entire charter of which it was designed to become a part. As they appeared on the ballot the amendments, seventy in all, bore no distinguishing marks except successive numbers and references to the sections of the charter proposed to be altered. Popular opposition was directed almost exclusively against four of the seventy propositions; the remainder went down to defeat with these four, many of the voters being uncertain as to the identity of the amendments as they appeared on the ballot, and hence voting against all rather than run the risk of voting for some of the very ones they opposed most strenuously. The four features which were responsible for the defeat of the entire revision plan made the following provisions: (1) Compulsory voting; (2) authorizing the city

commission to call an election on the question of issuing bonds to build a municipal coliseum; (3) establishing civil service for city employees; (4) reorganizing the city's financial system upon a more definite basis. While it was generally agreed that compulsory voting was desirable, there was a difference of opinion as to whether it would stand the constitutional test. The coliseum project was opposed for two reasons: First, that it was doubtful whether the city had a legal right to spend money on a building over which the municipal government might not exercise full control for an indefinite time; second, that the city taxes are already so high that any increases, such as would be necessitated if bonds for building a coliseum were issued, would be burdensome to the people. The civil service proposition stirred up a hornet's nest of opposition. Though the majority of the citizens seemed to be in favor of civil service, they objected to the particular plan offered by the drafters of the amendments. It was provided that in the competitive examinations the employees already in office would be required to make a grade of 75 per cent, while outsiders must make a grade of 100 per cent to be adjudged "perfect." It was charged that this plan would result in the creation of a self-perpetuating "machine" at the city hall. Members of the city administration contended that the chief consideration was to secure the most efficient employees, and that those who had been doing the city's work should be given credit for the experience which they had already acquired. The proposal to reorganize the financial system was made by city attorney George Gillette as a means of making the city's transactions more stable legally. As the financial transactions under the present charter are made by ordinance, Mr. Gillette said that litigation is invited; whereas, if the city's charter were the source of authority, it would be much more difficult to entangle the city in judicial and legal processes. It was this amendment that gained distinction for its length. Describing every step to be taken in almost every transaction, which the city might conceivably make, the amendment ran to the length of more than fifty typewritten pages. As it was difficult for the layman to understand all the details proposed, many people feared that the amendment contained a joker, or several jokers, which would mitigate against their financial interests. A committee of citizens had originally been appointed to draft amendments to the charter, but the propositions upon which the people voted were formulated by members of the present city administration—a circumstance that seemed to offend the citizens' committee and to arouse suspicion among the people. In any event, opponents of the amendments took advantage of the circumstance to make the charge that the city administration was scheming to create a self-perpetuating "machine," and on that allegation, more than any other, the amendments were defeated.

Commission Form Defeated.

East Rutherford, N. J.—By a vote of 332 to 174, the plan to adopt the commission form of government was lost here for the second time in six years. Every election district turned down the project. While the petition for a special election on the referendum had 243 names, a few more than required to demand an election, only 174 votes were cast for the proposition. The election cost the town about \$500. The total registration in the borough is 1,100. Last year 919 votes were cast.

Legislature Gives City Commission Form.

Jacksonville, Fla.—Governor Catts has signed the bill introduced by senator Farris of Duval for a commission form of government for the city of Jacksonville. The measure abolishes the Board of Bond Trustees and the Board of Port Commissioners. It is effective July 8. When the term of the present mayor expires the chairman of the board of commissioners will become head of the city departments. Under the bill's provisions the city council to be elected June 19, 1917, will, as soon after its organization as practicable, elect the first set of commissioners. After the expiration of their terms the qualified electors of the city at general elections will elect the commissioners for terms of four years each. The new law also abolishes

in June, 1919, the office of mayor. After that date the chairman of the city commission will be the ex-officio mayor, and will exercise the duties and powers now prescribed for the mayor. Under the new charter, the commission is vested with all executive duties of city government, with the one restriction that the city council must confirm appointments and many other stipulated actions. The five commissioners will receive salaries of \$3,000 each annually. After the terms of the present councilmen expire, the bill also increases the size of that body to eighteen members, one from each of eleven wards and seven at large. The bill provides for a board of charities, three of the seven members of which must be women. This body is appointed by the commission and in it is vested control of the city's charitable institutions. The city recorder, city treasurer and municipal judge are not affected by the new charter, but all other officers are under the supervision of the commission.

Commission Form Disapproved.

Delphos, O.—The proposition to provide a commission form of government for Delphos has been defeated at a special election by a vote of about four to one. There were 610 votes against the proposition and 160 for it. Less than half the vote of the city was cast.

Self Assessment Found Successful.

Columbus, O.—“People when left to make out their own returns do much better than when depending upon assessors.” This is the assertion of the state tax commission, which, with reports at hand from sixty-three county auditors, recently issued an announcement declaring the success of the new tax law is established. “The people of Ohio are fully capable of assessing themselves and in a more efficient manner than elected assessors have been able to do,” the statement says. The announcement sets forth that with the exception of Huron and one or two other counties the reports show the taxpayers of the state making gratifying returns. It claims the new law is operating economically, “as little work was left for the assessors to do.” It is stated that in Ross, Vinton and other counties the assessors in one day canvassed the returns and were dismissed, the voluntary returns being complete. These are other claims for the working of the law: In twenty-one of sixty-three counties out of the state's total of eighty-eight, the people made 20,000 more returns than were returned by assessors in 1916. The increase was before May 1. Practically every county shows an increase in personal property amounts. Increases range from 16 to 40 per cent and are shown in both rural and village districts. Many persons who in the past made no returns could not escape this year.

STREET CLEANING AND REFUSE DISPOSAL

Urge Chemists to Analyze Each City's Garbage.

Washington, D. C.—“Have your city food chemist analyze your city garbage from week to week and publish prominently what he finds as an index of food saving or waste in your community,” is the suggestion of the U. S. Department of Agriculture is making to municipal authorities throughout the country. Where there is no official chemist, the department points out, local chemists capable of determining percentages of fats, protein, starch, and organic matter wasted in garbage can render great service to the nation by volunteering to make these analyses in their localities. Vast amounts of bread, meat, and edible fats are wasted in the garbage and tons of valuable feedstuff for animals are lost to the food supply of the nation by usual garbage reduction or disposal methods. One of the first results from the careful analysis of city garbage should be the passage of more rigid enforcement of garbage-collection ordinances, requiring that no glass, tin, wood, burnt matches, paper, string, or inorganic trash be mixed with the vegetable material, meat scraps, or bones which can be used for feed. This dual collection of garbage and trash is being rigidly enforced by Germany in all cities of 40,000 people. Garbage so collected from population of 17,000,000 people in Germany, although the German garbage pail

always has been leaner than the American one and is especially light at this period, furnished briquettes rich in protein, which, when fed to dairy cattle produced 1,500,000 to 2,000,000 quarts of milk daily. In most American cities, however, garbage is sent to reduction plants where all the fat and oil it contains is recovered for use in making soap or greases. The residue after the oil is extracted is used as fertilizer or dumped into the ocean. This practice has been highly profitable because the American garbage pail is very rich in fat, American garbage averaging 3 per cent of fat, while German garbage rarely shows even 1 per cent of fat, as the German people never have been wasteful of animal or other fats. Another reason for the uses of the reduction methods is that in many cities ordinances prevent the use of garbage for feeding animals, particularly dairy cows, although there is no valid hygienic objection to the use of dried and properly sterilized garbage as food for cattle or hogs. The department specialists believe that as the thrift idea gains ground less and less fat will be thrown into the garbage pail and are hopeful that the time is not far distant when the amount of fat will make reduction for the recovery of oils hardly worth while. This will mean that a lot of excellent and valuable foodstuff now being wasted as food will never get into the garbage pail. Even when all fat is eliminated, however, and waste of bread and cereals and meat has been reduced to a minimum, the garbage pail, nevertheless, will contain in the form of parings, plate scraps and trimmings a vast amount of material which should be conserved and used as feed for hogs, cattle, or poultry.

Health Department Surveys Food Waste.

New York, N. Y.—State and city forces having to do with the raising and distribution of the food supply are concentrating their efforts in a campaign for economy. Lucius P. Brown, director of pure foods and drugs of the department of health, estimates, after an investigation, that almost twice as much food is wasted by persons living in Harlem and the upper end of Manhattan as by the residents of the lower east side, the poorer section. In the section between West 110th and 155th streets, the North River and Lenox avenue, with an estimated population of 234,748, director Brown found that 540 cartloads of food were thrown away each week as garbage. On the east side, in the district bounded by East River and Lafayette street, East 12th and Broome streets, he found that only 297 cartloads per week were taken away. One of the largest sources of wastage found, though not the most costly, was the throwing away of the outside leaves of cabbage, the greens of beets, celery, and cauliflower, all of which, director Brown says, should find a place in the soup pot or should be used as table vegetables. Hotels and restaurants reported that there was little or no waste in fish and meat, while the greatest waste was in butter, milk, cream and eggs. The reason for this was the making of rich and fancy pastry, but even this wastage was being reduced. Nearly all hotels and restaurants, director Brown found, were attempting with success to cut down the bread wastage, and in some places this had been reduced to a minimum. In one hotel the wastage had been reduced from a barrel a day to a barrel a week.

Utilization of Waste Materials in England.

London, England.—The importance of utilizing waste food, particularly fat and bones, other organic waste (of both animal and vegetable origin), and also waste paper, cardboard, etc., is the subject of a recent circular issued to municipal authorities by the Local Government Board. Waste from hotels, restaurants, canteens, clubs and other large establishments is being generally collected and used for feeding pigs, rabbits or poultry; but in the case of private households co-operation by means of voluntary associations is urged to secure the profitable use of all waste. Emphasis is also laid on the value of bones and fat for the production of glycerin for munitions purposes. The quartermaster general's department has in operation a plan for utilizing camp refuse for this purpose that is said to show good results. While the English-made glycerin was £58 [\$282] per ton, the United States fixed their figure at

£240 [\$1,168] per ton. During the first month the scheme was put into operation a weekly return to the army for camp refuse was made of £1,800 [\$8,760]. In January of this year the weekly amount increased to £9,500 [\$46,232], representing approximately £500,000 [\$2,433,250] annually returned to the Army for waste rations. The production of glycerin from these waste camp products enabled the ministry of munitions to dispense with over 1,000 tons of foreign glycerin at a saving in cost of £180,000 [\$875,970]. The new restrictions on the importation of paper make it more important than ever that the greatest economy should be practiced in its use, and that all waste paper should be utilized. In many districts the collection of waste paper, cardboard, etc., is already undertaken by dealers or through voluntary organizations. It is suggested, however, that more can be done, and it is hoped that all local authorities will use their best endeavors to stimulate action. For instance, waste paper, it is urged, should not be burned in the destructors, and local authorities should arrange where possible for its separation from other refuse if collected at the same time. Householders are urged through the press to keep it separate from other refuse. It is understood that for the profitable disposal of waste paper it will be sorted into the following grades: (1) Old ledgers and account books; (2) letters and envelopes; (3) old newspapers; (4) books and pamphlets; (5) brown and wrapping paper; (6) cardboard, strawboard, etc.

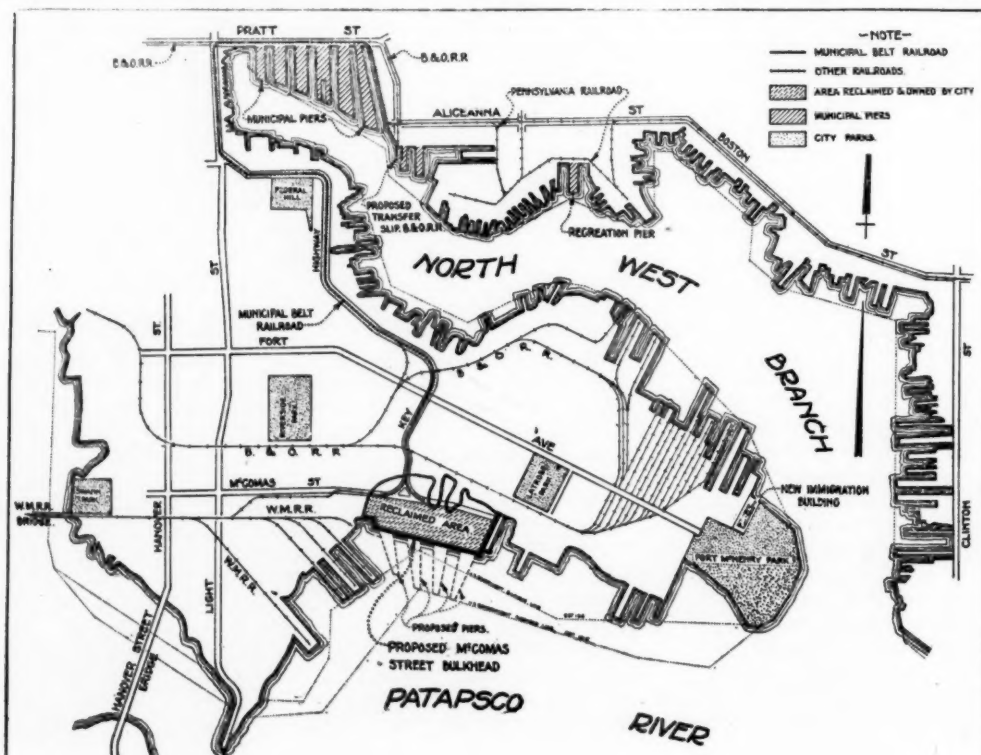
MISCELLANEOUS

The Massachusetts Housing Experiment.

Lowell, Mass.—The legislature has finally passed the bill for establishing low-priced homes by the state. The original plan called for the expenditure of \$100,000 for homes in Lowell as an experiment but the legislature has appropriated \$50,000. The measure had been reported adversely by the ways and means committee on the ground that with building materials so high as at present, it would be impossible for the commission to provide homes at a cost within the reach of workingmen and that workingmen should not be expected to purchase homes built during a period of such high prices. The leaders of those who favored the bill made some very effective speeches and the legislation was passed. On the two tracts chosen about 38 houses can be built, but according to Henry Sterling, secretary of the commission, only about twenty houses can be built with the money appropriated. It is planned to sell the houses to workingmen on the installment plan.

Baltimore Develops Its Waterfront.

Baltimore, Md.—According to a statement by S. R. Alexander, acting harbor engineer, the city has recently acquired by purchase the waterfront property, including all riparian rights, lying south of McCombs street and between the property of the Baltimore Electric Company on the west and the Page Engineering Company on the east. Located on McCombs street, at the southern terminus of the third section of the Key Highway, which streets are now being graded and paved, the property is one of the most desirable and best situated of the few remaining undeveloped properties along the waterfront in close proximity to the center of the city. When the work of constructing the Key Highway has been completed, the property will be connected to the business section of the city by wide, well-paved, low-grade streets, which will make it a particularly desirable location for industries having considerable trucking intercourse with the city. The municipal belt railway, which is to be constructed in the beds of Key Highway and McCombs street, will provide means by which the property may be connected by railroad to the several trunk line railroads now entering the city. At the present time, practically all of the land included in the tract is under water and to reclaim it will require the construction of 2,790 feet of bulkhead and the placing of about 600,000 cubic yards of filling material. To make this fill the city proposes to utilize the waste material, such as ashes and street sweepings collected by the street cleaning department. This material will probably be mixed with material of a better character obtained from dredging operations, or elsewhere. The bulkhead will be largely constructed of material from the old Light street bridge, which was torn down and removed immediately upon the completion of the Hanover street bridge and the diversion of traffic thereto. The front, or main portion of the bulkhead, will have a length of 1,886 feet. Return, or end bulkheads, are to be erected along the division lines between the properties to connect the front bulkhead with the shore. When completed, the bulkheads will enclose an area of about twenty-three acres. While it is not the intention of the city to construct any piers at the present time, the line adopted for the location of the front bulkhead is such that piers of a length sufficient to accommodate the largest vessels may at any future time be constructed between it and the Government pierhead line; if such piers be extended in a direction normal, or practically normal, to the bulkhead as shown in the cut, they would be about 800 feet long, if extended in a diagonal direction at an angle of 56 degrees with the bulkhead they would be 1,000 feet long.



BALTIMORE'S
NEWLY ACQUIRED
WATERFRONT
PROPERTY.
PROPOSED
DEVELOPMENT OF
MUNICIPAL BELT AND
RAILROAD TERMINALS,
COMMERCIAL DISTRICT,
PIERS AND
BULKHEADS.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Police Power—Regulating Dogs Running at Large.

(Okla.) Ordinances may be passed regulating or even prohibiting dogs from running at large in municipalities.—*Robberson v. Gibson*, 162 P. 1120.

Police Power—Storage of Gasoline.

(Ark.) A municipality is not deprived of its power to ordain that gasoline, etc., shall be stored in certain manner by the fact that oil companies affected have provided facilities rendering their tanks harmless, if properly used.—*Pierce Oil Corp. v. City of Hope*, 191 S. W. 405.

Control of Streets—Delegated Power.

(Ind.) The right to control and vacate public streets rests with the Legislature, but in this state such jurisdiction has been delegated to local authorities.—*Falender v. Atkins*, 114 N. E. 965.

Regulation of Billboards—Police Power.

(U. S. Sup.) An ordinance passed under authority of law to regulate maintenance of billboards is valid exercise of police power.—*Thomas Cusack Co. v. City of Chicago*, 37 S. Ct. 190.

Municipal Control of Streets.

(N. Y. Sup.) Public service corporations derive their right to use the streets directly from the state, the right of a municipality to control such use being as agent of the state.—*Holmes Electric Protective Co. v. Armstrong*, 162 N. Y. S. 770.

Police Regulations—General Laws.

(Wash.) Laws 1915, pp. 227, 385, do not prevent municipal corporations from enacting police regulations and restrictions and revenue measures operative within their limits not inconsistent therewith, as authorized by the express provisions of Const. art. 11, § 11.—*Allen v. City of Bellingham*, 163 P. 18.

Assessing Cost—Segregating Costs.

(Wash.) An assessment of the cost of a local improvement can be reduced, the evidence showing a clear segregation of the parts conferring a benefit from the part not conferring benefit, and the cost of each.—*Horton Inv. Co. v. City of Seattle*, 162 P. 989.

Power to Contract for Paving—Power of Mayor.

(Tex. Civ. App.) Where city by ordinance empowered mayor to make contract for street paving, the work to be controlled by the city engineer, it was beyond the mayor's powers to include in the contract an arbitration agreement, and the city was not bound thereby.—*City of San Antonio v. Reed*, 192 S. W. 549.

Public Park—Governmental Power—Liability.

(Ga. App.) Where city maintains public park, its operation is in virtue of its governmental powers, and no municipal liability attaches to nonperformance or improper performance of duties of agents in keeping it safe for use by public, even though purely incidental profit might result from its operation.—*Cornelisen v. City of Atlanta*, 91 S. E. 510.

Limit to Assessment of Property.

(Wash.) Property not benefited cannot be assessed, nor can property be assessed for more than it is benefited, on purely benefit assessments.—*In re Shilshole Ave.*, 162 P. 1010.

Petition—Contract—Estoppel for Insufficiency of Contract.

(Kan.) Where proper city officials find petition to pave street signed by a sufficient number of abutting owners and adopt paving resolution and let contract, city is estopped to deny sufficiency of petition in contractor's action for compensation for work actually done under contract.—*John Ritchie & Sons v. City of Wichita*, 163 P. 176.

Raising Streets—Assessing Cost.

(Wash.) The raising of a street within an improvement district solely to benefit property outside it, as necessary for a sewer when made to accommodate property outside the district, cannot be assessed to property in the district.—*Horton Inv. Co. v. City of Seattle*, 162 P. 989.

Police Power.

(Ala.) Private property must be held subordinate to the police regulations of a city, yet lawful property cannot be destroyed or confiscated under mere guise of police regulation for its protection.—*Spear v. Ward*, 74 So. 27.

Police Power—Regulating Business.

(Cal.) Under police power use of property or conduct of business may be restricted to extent reasonably thought necessary to promote public health, safety, etc., but arbitrary or oppressive restrictions will be condemned as in conflict with fundamental constitutional rights.—*Ex parte Barmore*, 163 P. 50.

Changes in Plan—Paying Extra Expense.

(N. Y. Sup.) Where changes were made in city's plan of opening street after commencing proceedings, expenses incurred prior to making changes and rendered useless thereby must be borne by city and not by property owners.—*In re Second and Third Sts. in Borough of Queens*, 163 N. Y. S. 521.

Sea Wall Construction—Assessing Cost.

(Miss.) Where municipality constructed sea wall, it cannot arbitrarily impose one-half of expense on property owners abutting the improvement regardless of cost of construction and actual benefit conferred, for such assessment might be confiscatory.—*Sick v. City of Bay St. Louis*, 74 So. 272.

Condemning Property—Using for Another Purpose.

(N. Y. Sup.) Same rule applies to acquisition of lands for streets openings as applies to assessment for benefit; that is, property acquired for public purpose cannot be condemned for another public purpose, except by express authority, nor can it be assessed for an improvement.—*In re Seneca Ave. in City of New York*, 163 N. Y. S. 503.

Prohibiting Use of Streets for Poles and Wires—Validity.

(Ill.) Ordinance prohibiting use of city's streets or alleys for erection of poles and wires or other fixtures without permission of mayor and street and alley committee is void, as attempted delegation to such officers of power to regulate use of streets which is vested in city council by Cities and Village Act, art. 5, § 1.—*City of Sullivan v. Cloe*, 115 N. E. 135.

Assessing Street Improvements—Reconstructing Street.

(Ky.) Under Ky. St. §3572, empowering fourth class cities to construct streets at cost of abutting owners, and providing that the cost of construction after the streets were once constructed at the expense of owners must be borne by the city, a highway, constructed 20 feet wide under Laws 1889-90, c. 1559, at the expense of the general population, could be reconstructed 40 feet wide at expense of abutting owners.—*Carran v. City of Ludlow*, 192 S. W. 526.

Right of Way—Failure to Provide—Extra Work.

(U. S. C. C. A.) Where municipality agreed to furnish right of way for its waterworks system and contract provided that claims for extra work, etc., should be presented within 14 days or same should be waived, a claim for loss suffered by the contractor by reason of the failure to furnish right of way cannot be defeated for want of presentation within such time.—*Pitt Const. Co. v. City of Dayton*, 237 F. 305.

Presentation of Petition—Procedure.

(N. J. Sup.) Under P. L. 1911, p. 478, § 16, and P. L. 1915, p. 623, § 2, and page 630, § 11, as to initiative procedure, held that the city clerk when presented with a sufficient petition for an ordinance and later with a petition withdrawing some of the names, acted unwarrantedly in first presenting to the board the withdrawing petition, and that the board acted unwarrantedly in permitting the withdrawal before passing on the original petition.—*Ford v. Gilbert*, 99 A. 621.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND STREETS.

Accounting:

Accounting System of the Milwaukee County Highway Department. 1,000 words. May 12. 10 cts.
Cost Keeping Forms of Oregon State Highway Commission. 11 ills., 3,000 words. Engineering and Contracting, May 30. 10 cts.

Asphalt:

To Pave Over New York Subway with Sheet Asphalt. Fill over Broadway tubes will require five years to settle. Asphalt is preferred under these conditions. 800 words. Engineering News-Record, May 10. 15 cts.

Asphalt Concrete Binder for Sheet Asphalt at Chattanooga, Tenn. Used on two repaving jobs last year. Specifications and details of construction. 1,500 words. Engineering and Contracting, May 2. 10 cts.

Asphaltic Concrete:

Asphaltic Concrete Roads as Developed by the Philadelphia Bureau of Highways. By E. A. Trego. 3 ills., 1,000 words. Good Roads, May 12. 10 cts.

Bitulithic:

Bitulithic Pavements Laid in 1916 and Proposed for 1917. Design, cost and quantity are shown. 2 pages. Municipal Engineering, May. 25 cts.

Bituminous:

The Construction of Bituminous Pavements. In a preceding article the plant section of asphalt pavement construction was considered. The principal topic of this article is detail of street operation. By C. C. Brown. 14 ills., 10,000 words. Municipal Engineering, May. 25 cts.

Bituminous Macadam Roads. Methods of construction. By Sam R. Murray. 5 ills., 3,500 words. Better Roads and Streets, May. 15 cts.

Macadam Reconstructed as Bituminous Macadam. Cheap and simple method produces a smooth and hard surface at a cost of 37 cts. a yard. By H. J. Spelman. 800 words. Engineering News-Record, May 3. 15 cts.

Best Results Not Obtained with Thick Bituminous Carpets. Macadam roads are better maintained with a thin oil. By C. A. Hogentogler. 1,000 words. Engineering News-Record, May 31. 15 cts.

Massachusetts' Method of Bituminous Road Construction. Abstract of paper by W. D. Sohler. 2,250 words. Engineering and Contracting, May 2. 10 cts.

Concrete:

Machine Finishing of Concrete Road. 5 ills., 2,000 words. Municipal Engineering, May. 25 cts.

Wear on Concrete Road Surfaces. Second of a series of three articles. The first stage of wear; scaling of the surface. By C. B. McCullough. 9 ills., 2,200 words. Concrete, May. 20 cts.

Construction:

Road Building, Involving Theory, Method, Principle and Practice. By G. D. Strader. 1,250 words. Better Roads and Streets, May. 15 cts.

Road Construction and Improvement by Means of Town Planning Schemes. By W. Rees Jeffreys. 8,000 words. The Surveyor, April 27. 40 cts.

Salvaging Old Street Reduces Cost of New Pavement. Screening and crushing old pavement and curbs saves 60 per cent in cost of crushed stone. 1 ills., 650 words. The Contractor, May 11. 10 cts.

Methods of Handling Earth in Road Construction. Light excavation and embankment on previously graded old roads; excavation and embankment on roads not previously graded; light grading in repair of old roads. By C. R.

Thomas. 5,000 words. Engineering and Contracting, May 2. 10 cts.

Contractors' Plant and Equipment for State Road Construction. Abstract of paper by John H. Gordon. 2,750 words. Engineering and Contracting, May 2. 10 cts.

Gas Tractors Build Dirt Roads for \$60 a Mile. Maintenance is simple. By E. R. Morgan. 1 ills., 800 words. Engineering News-Record, May 3. 15 cts.

National Parks Road Construction. Features that determine alignment and grades. Methods of draining, grading and surfacing. Types of structures used. Work of dominion government department in the good roads movement. By J. M. Wardle. 12 ills., 3,500 words. Canadian Engineer, May 24. 15 cts.

Convict Labor:

Convict Labor on Nebraska Roads. By Geo. E. Johnson. 1,000 words. American City, May. 50 cts.

Cost:

Cost of Resurfacing Trenches in Los Angeles. 200 words. Engineering and Contracting, May 2. 10 cts.

Unit Prices for Road Work in Minnesota in 1916. 800 words. Engineering and Contracting, May 2. 10 cts.

Reducing Rural Road Construction Costs by Increasing Efficiency of Operation. Abstract of paper by Wilmund Huber. 4,000 words. Engineering and Contracting, May 2. 10 cts.

Estimating the Cost of Paved Surfaces for Highway Improvement. Materials; labor. By R. E. Thomas. 2,200 words. Engineering and Contracting, May 2. 10 cts.

County Work:

County Highway Work in 1916. Tables supplementing those in April 5 issue. 1 page. Municipal Journal, May 31. 10 cts.

Curbs:

Monolithic Curb with Integral Asphalt Expansion Joints. By E. E. Kirkpatrick. 1 ills., 250 words. Engineering News-Record, May 10. 15 cts.

Drainage:

Results of Improper Street Drainage. By Haldane White. 3 ills., 1,000 words. Good Roads, May 5. 10 cts.

Drainage and Foundations. Emphasizes the importance of good drainage and proper foundation. By C. R. Thomas. 3 ills., 4,000 words. Better Roads and Streets, May. 15 cts.

Grade Crossings:

Lessening the Danger of California Grade Crossings. Work done to reduce accidents at grade crossings. 1,000 words. Good Roads, May 5. 10 cts.

Recent Practice in the Construction of Granite Block Pavement. Discussion of paper presented by Wm. H. Connell. 2,000 words. Engineering and Contracting, May 2. 10 cts.

Railroad Grade Crossing Problem in Wisconsin. 1,700 words. Good Roads, May 12. 10 cts.

Gravel:

Gravel Roads in Michigan. Methods of construction. Material used. 4 ills., 2,500 words. Good Roads, May 12. 10 cts.

Gravel Roads for Modern Traffic. Has special reference to the gravel roads of New Hampshire. 2,000 words. Municipal Engineering, May. 25 cts.

Legal:

Highway Legislation in Texas. Features of recent laws. 1,000 words. Good Roads, May 19. 10 cts.

Minnesota Road Law Amended. Features of new law. 4,000 words. Good Roads, May 26. 10 cts.

Materials:

Methods of Determining the Road Making Qualities of Deposits of Stone

and Gravel. By L. Reinecke. 9 ills., 2,000 words. Good Roads, May 19. 10 cts.

Highway Commission Standardizes Sizes of Stone and Gravel. 1,000 words. Engineering News-Record, May 3. 15 cts.

Maintenance:

Maintenance of Concrete Roads. Describes the methods employed by the Connecticut Highway Department. By W. L. Ulrich. 2 ills., 3,000 words. Better Roads and Streets, May. 15 cts.

Oregon County Awards Prizes for Maintenance of Roads. Committee of engineers judges in contest to increase efficiency of county road supervisors. 900 words. Engineering News-Record, May 24. 15 cts.

Expenditures for Road Maintenance and Repair in Connecticut. 1,200 words. Good Roads, May 5. 10 cts.

The New Hampshire Patrol System of Gravel Road Maintenance. Abstract of hand book issued by state highway department. 1 ills., 2,200 words. Engineering and Contracting, May 2. 10 cts.

Miscellaneous:

Undergraduate Specialization in Highway Engineering and the Demand for Highway Engineers. Extracts from letters from department heads in many of the colleges and their views on the subject. 10,000 words. Good Roads, May 19. 10 cts.

Determining the Traffic Area of Improved Roads. B. C. R. Thomas. 750 words. Engineering and Contracting, May 2. 10 cts.

Barriers Protect Desert Road from Sand Drift. 3 ills., 500 words. Engineering News-Record, May 3. 15 cts.

A Sidewalk "Roof." A simple frame work to support canvas to protect the fresh concrete and to advertise the builder. 2 ills., 1,000 words. Concrete, May. 20 cts.

City Planning and Country Roads. Editorial discussion. 1,000 words. Municipal Journal, May 10. 10 cts.

Scenic Highways in Yellowstone National Park. Types of road built. Kind of traffic. 7 ills., 1,000 words. Good Roads, May 26. 10 cts.

Three-Section Shield a Feature of Fifth Avenue Tunnel Project. Contractor proposes to relieve traffic congestion in New York City by 1½-mile triple tunnel. 1 ills., 1,000 words. Engineering News-Record, May 10. 15 cts.

A Review of Road Administration in Michigan. By D. A. Thomas. 3,000 words. Better Roads and Streets, May. 15 cts.

Location and General Surveying for County Roads. By F. L. Duffy, Asst. Highway Engr. of Kentucky. 2 ills., 2,500 words. Better Roads and Streets, May. 15 cts.

Specifications and Contracts. Their relation to road construction. By E. W. James. 4,000 words. Better Roads and Streets, May. 15 cts.

Street Widening to Meet Traffic Demands. From a paper by Nelson T. Lewis. 5,000 words. Good Roads, May 26. 10 cts.

Portable Rock Crushing Outfit for Utilizing Old Macadam. 1 ills., 800 words. Engineering and Contracting, May 2. 10 cts.

Present Practice and Regulations Pertaining to Pavement Openings Throughout the U. S. 2,500 words. Better Roads and Streets, May. 15 cts.

Monuments and Bench Marks in Grand Forks. Method of permanently marking city. By H. G. Lykken. 700 words. Municipal Journal, May 10. 10 cts.

Winnipeg Sub-Surface Formation and Suitable Heavy Foundation Types. Geological formation. Bearing capacities and peculiarities of the stratification.

By J. Q. Rankin. 4,250 words. The Canadian Engineer, May 24. 15 cts.

Oils:
Road Oils and Tars. From a paper by Arthur H. Blanchard. 3,000 words. Better Roads and Streets, May. 15 cts.
Intelligent Use of Road Oil Reduces Maintenance. Of little actual value unless good drainage is provided. All soils are benefited, but the gums give best results. By T. R. Agg. 4 ills., 1,800 words. Engineering News-Record, May 24. 15 cts.

Paving:
Modern Heavy Traffic Destroys East River Bridge Paving. Floor system adequate when constructed has to be rebuilt. 4 ills., 2,000 words. Engineering News-Record, May 10. 15 cts.

Paving in Minot, N. D.—Street was graded with steam shovel. Methods of mixing and laying base. Wood block and bitulithic pavement was used. From a paper by Augustus Hunt. 1,750 words. Municipal Journal, May 17. 10 cts.

Transportation:
The Transportation of Highway Materials. The importance of modern methods in hauling road materials. Use of motor truck, steam roller and tractor and the industrial railway. From a paper by Geo. Hogarth. 3 ills., 3,000 words. Municipal Journal, May 10. 10 cts.

Wood Block:
Redesign of Wood Block Pavement on the Queensboro Bridge, New York City. 5 ills., 1,200 words. Good Roads, May 5. 10 cts.

SEWERAGE, DRAINAGE AND SANITATION.

Activated Sludge:

Air Diffusion in Activated Sludge. Entrained air introduced by downward sewage jet prolongs air and sewage contact. By W. S. Coulter. 2 ills., 1,250 words. Engineering News-Record, May 3. 15 cts.

Catch Basins:

Cleaning Catch Basins in Louisville. Auto eductor replaces hand work. Comparison with old methods of cleaning. Cost is greatly reduced. 1 ill., 1,500 words. Municipal Journal, May 10. 10 cts.

Concrete:

35 Cities Report Their Experience with Concrete Sewers. Results of an investigation conducted by the city of Chicago. 2 pages. Concrete, May. 20 cts.

Construction:

Construction of Vitrified Pipe Lines. Collects details of construction in convenient form. By J. F. Springer. 5 ills., 4,000 words. Municipal Engineering, May. 25 cts.

Shovel used to excavate sewer trench. 2 ills., 1,000 words. Municipal Engineering, May. 25 cts.

Drainage:

Methods and Costs of Supervising Drainage Construction in the Little River Drainage District. By B. F. Burns. 10 ills., 3,000 words. Engineering and Contracting, May 30. 10 cts.

Method of Making Drainage Assessments. 1,100 words. Engineering and Contracting, May 30. 10 cts.

Sanitation:

Films for Health and Welfare Campaigns. By E. G. Routzahn. 1,000 words. American City, May. 50 cts.

Traveling Health Department Laboratory. New Jersey State Department installs laboratory and chlorine gas apparatus in automobile. 1 ill., 1,000 words. Municipal Journal, May 24. 10 cts.

Tile:

Pipe and Drain Tile as Made in Sioux City. 1,500 words. Concrete, May. 20 cts.

Treatment:

Special Features of Sewerage Development at Wellsboro, Pa. Details of design and construction. By Henry W. Taylor. 5 ills., 2,600 words. Engineering and Contracting, May 9. 10 cts.

Septic Tanks Reconstructed as Imhoff Tanks at Columbus. Sludge disposal problem forced change. New tanks built while half of old plant was kept in service. By C. P. Hoover. 3 ills., 1,250 words. Engineering News-Record, May 31. 15 cts.

Sewage Disposal in Columbus. City takes whole river for water supply, leaving little for dilution of sewage. 800

words. Engineering News-Record, May 10. 15 cts.

Marked Advance in Treating Sewage from Packing Houses. Experimental activated sludge plant at Ft. Worth, Tex., is equipped with special revolving screen and settling tank. By G. B. Zimmele. 1 ill., 1,250 words. Engineering News-Record, May 31. 15 cts.

Rules Governing the Design of Sewage Treatment Plants and Outlet Sewers. 14 rules adopted by Board of Estimate and Apportionment of New York City. 1,200 words. Engineering and Contracting, May 9. 10 cts.

WATER SUPPLY.

Cleaning Mains:

Water Main Cleaning. 1,250 words. American City, May. 50 cts.

Construction:

Excavating Baldwin Reservoir, Cleveland. Methods and plant used. 1 ill., 1,100 words. Municipal Engineering, May. 25 cts.

Laying Out Field Work and Keeping Office Records on Earth Dam Construction. Phelps Brook dam of Hartford water supply used as an example of field and office details of construction. By S. P. Sears. 7 ills., 2,000 words. Engineering News-Record, May 3. 15 cts.

Traveling Chute Carriers Fed by Cars From Central Mixing Plant Fill Aqueduct Forms. Well planned haulage system and traveling chute carriers enable one set-up of mixer to finish 3,600 ft. of aqueduct. By W. R. Davis. 9 ills., 4,000 words. The Contractor, May 25. 10 cts.

New Reservoir and Water Mains Improve Service at Covington, Va. Concrete lined basin. By Harry Stevens. 4 ills., 1,800 words. Engineering News-Record, May 3. 15 cts.

Traveling Mixer Plants Deliver Concrete Direct to Winnipeg Aqueduct Forms. Four different plant arrangements all prove successful, but failure to equalize excavating outfit held back concreting operations. By John Armstrong. 8 ills., 2,250 words. The Contractor, May 11. 10 cts.

Costs:

Cost of Laying Water Pipe in Fall River. 250 words. Municipal Journal, May 3. 50 cts.

Water Costs in Cities of 60,000 Population or Over. Result of a questionnaire sent out by the city of Portland, Ore. 4 pages. American City, May. 50 cts.

Montreal Plant Makes Its Own Electrolytic Chlorine. Installation in operation several months. Costs compared with previous hypochlorite process. 1,200 words. Engineering News-Record, May 24. 15 cts.

Minneapolis Digs Large Water-Main Trenches by Machine. Excavation for 54-inch main costs 9.3 cents per cubic yard. Backfilling done by steam shovel for 21.2 cts. 1 ill., 450 words. Engineering News-Record, May 24. 15 cts.

Dams:

Construction Features of Concrete Dam for Ottumwa, Ia. Water Works. 5 ills., 2,000 words. Engineering and Contracting, May 9. 10 cts.

How Standley Lake Dam Was Built and the Story of Its Slips. Material on faces of earth structure has slipped twice in 6 years. By John Hayes and A. Lincoln Fellows. 8 ills., 3,500 words. Engineering News-Record, May 31. 15 cts.

Design:

New Design of Screen Chamber. Abstract of paper by J. H. Lance, before convention of American Water Works Association. 1 ill., 700 words. Engineering News-Record, May 17. 15 cts.

Filtration:

Growth of Filter Sand at Three Water Softening Plants. Incrustation of filter sand passing water treated with lime for softening purposes largely increases the effective size and reduces the uniformity coefficient. The sand growth and the loss of sand in washing result in an eighth of the original sand ultimately filling the filter tank to its original sand surface level. Results of three plants—Columbus, Grand Rapids and McKeesport—given in three articles. By Chas. P. Hoover. 2,500 words. Engineering News-Record, May 3. By W. A. Sperry. 1 ill., 2,000 words. May 10. Edward C. Trax. 1,300 words. May 17. 15 cts. each.

Wrestling with Filter Bottom Troubles at Minneapolis Plant. Abstract of paper by L. I. Birdsall, before convention

of American Waterworks Association. 700 words. Engineering News-Record, May 17. 15 cts.

Air Compressed Water Washes Filters. By doing away with pump, cost of installation is cheapened. 1 ill., 500 words. Engineering News-Record, May 3. 15 cts.

Water-Filtration Progress to Date. Accomplishments by states and provinces summarized. 784 plants in 1917 as against 50 in 1900. 600 words. Engineering News-Record, May 24. 15 cts.

Water Filtration in the U. S. and Canada. Number of plants in the various states, their total capacity and the population supplied by them. 800 words. Municipal Journal, May 3. 50 cts.

Joints:

Lead Wool and Its Advantages. From a paper by R. J. Thomas. 1,000 words. Municipal Journal, May 31. 10 cts.

Cement Joints for Cast Iron Mains. History of the use of this type of joint. Description of method of making joint and of removing pipe. From a paper by C. H. Shaw. 8 ills., 2,800 words. The Canadian Engineer, May 24. 15 cts.

Meterage and Consumption:

Lancaster Water Works Notes. Meter readers examine properties for leakage where consumption is unusual. Removing meters for repairs. Electric pumping adopted. 1,250 words. Municipal Journal, May 24. 10 cts.

Water Meters Would Pay Chicago. Report made to city engineer contends that meter program would save billions of gallons and millions of cash. 1 ill., 600 words. Engineering News-Record, May 24. 15 cts.

Metering in Mt. Pleasant. By Henry Traxler. 400 words. Municipal Journal, May 10. 10 cts.

Metering in Somerville. Consumption reduced more than 20 per cent by metering. Reduction in demands on sewerage system and on sewage pumping also an important item. Consumption figures for the past thirteen years. By S. E. Merrill. Water Comr. 1,500 words. Municipal Journal, May 17. 10 cts.

Metering in Waltham. Introduction of meters removed the necessity of increasing the water supply at a cost much greater than that of metering. By Bertram Brewer. 1,000 words. Municipal Journal, May 3. 50 cts.

Metering at Coldwater, Mich. By L. E. McQueen. 750 words. Municipal Journal, May 10. 10 cts.

Forms for Water Consumption Data. Recommended by joint committees of the American and New England Water Works Associations. 1,200 words. Municipal Journal, May 24. 10 cts.

Night Rate Consumption in a Fully Metered City. Method of hunting leaks includes feeding isolated districts through fire hose and small meters. 2 ills., 1,200 words. Engineering News-Record, May 3. 15 cts.

Miscellaneous:

A Correct Theory of Prorating Cost in Fixing Water Rates to Secure Industrial Business. 1,500 words. Engineering and Contracting, May 9. 10 cts.

Sanitary Drinking Fountains. Investigations at the University of Minnesota indicate contamination of nozzles by drinkers. New type prevents this. 3 ills., 1,300 words. Municipal Journal, May 24. 10 cts.

War Time Measures by American Cities. What they are doing to meet the problems of war time. 7½ pages. American City, May. 50 cts.

American Water Works Association Convention. Complete account. 4,500 words. May 17. 10 cts. 5,000 words. May 24. 10 cts.

Operation:

Operating Results of Panama Canal Zone Filtration Plant. 800 words. Engineering and Contracting, May 9. 10 cts.

Making the B. Coll Test Tell More. Theory of probabilities promises results of more significance to water analysis and intelligible to laymen. By Milton F. Stein. 3 ills., 3,200 words. Engineering News-Record, May 24. 15 cts.

Water Works Intake Guarded by Ice Fender. Preventing clogging at Detroit. 1 ill., 800 words. Engineering News-Record, May 10. 15 cts.

Spore-Forming Lactose Splitters Get Water Supply Into Trouble. Sacramento finds less chlorine necessary, but old pollution requires closer methods of B. coli identification. 800 words. Engineering News-Record, May 10. 15 cts.

The Worcester Water Watch. Or-

ganization of the water department. By Ellis H. Custer. 4 ills., 2,000 words. American City, May. 50 cts.

The Work of the Service Force of the Water Works Department of Minneapolis. By J. A. Jensen. 4,500 words. Engineering and Contracting, May 9. 10 cts.

Oak Park's Water Works Report. Records are unusually complete and well classified. 1 ill., 1,500 words. Municipal Journal, May 3. 50 cts.

Springfield Water Works Notes. Department manufactures sulphate of ammonia. Public use of water. Scarcity of labor limits pipe-laying. 1,250 words. Municipal Journal, May 3. 50 cts.

Salt Test for Flow Works Well in Infiltration Gallery. Salt injected up at upper end dilution measured below. Desirable where current meter can not be used. 1,200 words. Engineering News-Record, May 3. 15 cts.

Pipes:

Cast Iron Pipe Specifications. Pipe users of water works associations agree on tentative revision, but manufacturers opposed to change. 4,000 words. Engineering News-Record, May 31. 10 cts.

Wood Stave Pipe for Everett Water Supply. Line 27 miles long. Metal pipe will be used where head exceeds 350 feet. By R. E. Koon. 2 ills., 500 words. Engineering News-Record, May 3. 15 cts.

Pumping:

Collingwood Pumping Station. Description of improvement to water works. Methods and cost of changing to electrical pumping. By E. J. Stapleton. 2 ills., 1,250 words. The Canadian Engineer, May 24. 15 cts.

Marine Type of Diesel Engine Adapted to Water Works. Latest designs for stationary pumping units are to be found in Dutch installations. Accessibility of working parts a feature. By Thomas Orchard Lisle. 2 ills., 2,000 words. Engineering News-Record, May 3. 15 cts.

Pumping With Oil in Oxnard. 600 words. Municipal Journal, May 31. 10 cts.

Clarksburg's Pumping Plant. Gas engines and centrifugal pumps more economical than any steam plant combination. Gas fired boilers and duplex pump previously used. 1 ill., 1,000 words. Municipal Journal, May 17. 10 cts.

Purification:

Multiple Inspirators Aerate Algae Laden Lake Supply. Filter plant has vortex-whirl sawdust and sediment remover, also combined ridge-and-valley and plenum underdrain system. 6 ills., 2,000 words. Engineering News-Record, May 3. 15 cts.

Carbon Dioxide and Iron in Water Supply. Discusses red water trouble. By C. G. Wigley. 2 ills., 2,000 words. Engineering and Contracting, May 9. 10 cts.

Service Pipes:

Ownership of Water Service Pipes. Practice as to pavement. Private individuals can not own property in public streets. Services are the property of the company or the city. 1,750 words. Municipal Journal, May 10. 10 cts.

Standards:

Water Supply Standards. Resume of legislation and regulations defining technical standards for water supply. From a paper by Wm. J. Orchard. 4,500 words. The Canadian Engineer, May 24. 15 cts.

Water-Supply Standards and Their Improvement. Abstract of a paper by Wm. J. Orchard before the American Water Works Association convention. 1,600 words. Engineering News-Record, May 17. 15 cts.

Treasury Department Standard for Drinking Water. Abstract of a paper by H. P. Letton before the American Water Works Association convention. 1,200 words. Engineering News-Record, May 17. 15 cts.

Systems:

A Forty-Five-City Water System. One company, from one plant, supplies water to 45 communities. General layout of force mains, reservoirs and pumping station. High and low service. Describes system of the Hackensack Water Company. 6 ills., 2,500 words. Municipal Journal, May 3. 50 cts.

Development of a Water System. History of the water works of New Bedford, Mass. Development of supply. Population has doubled in 15 years and meters increased tenfold. By R. C. P.

Coggeshall. 2 ills., 1,750 words. Municipal Journal, May 3. 50 cts.

Thawing Pipes:

Thawing Service Connections. Electrical thawing in New York and other cities. Costs and charges to consumers. Thawing a 6-inch pipe under water. From a paper by H. D. Machen. 5 ills., 4,000 words. Municipal Journal, May 17. 10 cts.

Trenching:

Are Trench Machines Adapted to Laying of Water Mains? 1,200 words. Engineering News-Record, May 10. 15 cts.

Use of Trenching and Back-Filling Machines from Maine to California. Practice and experience of cities and contractors in water works, sewerage and other construction. 1,800 words. Engineering News-Record, May 3. 15 cts.

Water Works:

Water Works Statistics of American Cities. Reports from the superintendents of more than 800 cities are compiled in this issue. Information is given concerning sources of supply, distributing systems and appurtenances, pumping plants, purification plants, services, meters and other details. 34 pages. Municipal Journal, May 3. 50 cts.

New Water Works at Providence to Cost \$12,000,000. Reservoir will be formed by earth dam 100 feet high. Three types of construction used in 7-mile aqueduct. By Frank E. Winsor, Chief Engineer. 2 ills., 3,000 words. Engineering News-Record, May 3. 15 cts.

A Municipal Water Works Constructed and Operated Solely for Industrial Service. 800 words. Engineering and Contracting, May 9. 10 cts.

LIGHTING AND POWER.

Distribution:

Recent Developments in High Pressure Distribution. Joints. Cost of making three types of joints. Cost of turning joints for several sizes of pipe. Valves. Connections, etc., 6 ills., 4,000 words. Gas Age, May 15. 20 cts.

Finance:

February Central Station Statistics. Earnings show an increase of 13.4% over Feb., 1916, while the output shows an increase of 21.5%. 3,000 words. Electrical World, May 5. 10 cts.

Can Central Stations Offer Lower Power Rates? By P. Emerson Hoar. 2,000 words. Electrical World, May 26. 10 cts.

Collection of Delinquent Accounts. Outline of results obtained by competition between district officers. Employment of young attorneys found effective. By L. A. McArthur. 1,500 words. Electrical World, May 26. 10 cts.

Heating:

Progress in the Use of Gas for House Heating. 3,000 words. Gas Age, May 15. 20 cts.

Electric Heating and the Central Station. Immense and practically untouched field of electro-thermal processes requiring comparatively low temperatures. 1,600 words. Electrical World, May 26. 10 cts.

Management:

Principles of Power Plant Management. Outlines the methods of inquiring into the factors and details that influence the cost of power. By W. N. Polakov. 2 ills., 3,500 words. Power, May 15. 10 cts.

Load, Plant and Connected-Load Factors. Last of a series of three articles. A graphic analysis of the common factors with actual problems showing their application. By Terrell Croft. 9 ills., 3,000 words. Electrical Review, April 14. 10 cts.

Small Town Electric Service Problems. Steel pole used in distribution system. Steel-cored aluminum wire employed in transmission and distribution lines. Bond issue provides for house wiring. 7 ills., 1,250 words. Electrical World, May 5. 10 cts.

Miscellaneous:

Industrial Uses for Natural Gas. Abstract of paper by R. A. Ziegler. 6 ills., 4,000 words. Gas Age, May 15. 20 cts.

Use of Concrete in Hydroelectric Works. Gives important instances of its use. 5 ills., 4,000 words. Water and Water Engineering, April 16. 40 cts.

How to Detect and Deal With Electricity Thieves. Methods and practices that central stations have found valu-

able in making collections and in stopping the theft of electric energy. 1 ill., 3,000 words. Electrical World, May 26. 10 cts.

Oil Engines:

Fuel Oil for Stationary Power Plants. Steam jet burners are best suited for this work. Results of recent comparative boiler tests. By Frederick Ewing. 3,000 words. Power, May 8. 5 cts.

The Study of Oil Engines in Iowa. Continued from March issue. 1 ill., 3,500 words. Iowa Engineer, April. 15 cts.

Oil Engines vs. Transmission-Line Service. Line 20 miles long can compete with service from an isolated plant. 800 words. Electrical World, May 26. 10 cts.

Steam vs. Oil Engines for a Small Light Plant. How the type of engine was decided upon when it was necessary to replace an old one with one or two units. The choice was between three types of engines. How a decision was arrived at. Semi-Diesel units were chosen. By L. H. Morrison. 6 ills., 1,500 words. Power, May 15. 10 cts.

Poles:

Concrete Poles Now Made Here by Centrifugal Process. European method of making concrete poles by turning filled mold in giant lathe introduced in U. S. 1 ill., 600 words. Engineering News-Record, May 24. 15 cts.

Street Lighting:

Ornamental Street Lighting System in Ottawa, Kans. By W. O. Myers, Supt. 2 ills., 1,000 words. American City, May. 50 cts.

New Street Lighting in Los Angeles. By C. W. Geiger. 1 ill., 750 words. Municipal Journal, May 10. 10 cts.

Transmission:

Power Carried 548 Miles from Hydro-Electric Station. In constructing reservoirs and stations, tractors carried material 56 miles and cable railways lifted it to dam site. 4 ills., 1,750 words. Engineering News-Record, May 10. 15 cts.

FIRE AND POLICE.

Toledo Fire Alarm System. 1,000 words. Firemen's Herald, May 5. 5 cts.

Motor Apparatus in Fire Department. 1 page. Municipal Engineering, May. 25 cts.

April's Fire Loss. Loss throughout the U. S. and Canada. 500 words. Firemen's Herald, May 12. 5 cts.

Preventive Measures in Police and Fire Department. 1,200 words. American City, May. 50 cts.

Emergency Measures Adopted by the New York Fire Department. By Robert Adamson, Fire Comr. 1 ill., 2,000 words. American City, May. 50 cts.

Storage of Motion Picture Films. 800 words. Firemen's Herald, May 5. 5 cts.

The Fire Service of Dublin, Ireland. 1,000 words. Fire & Water Engineering, May 9. 10 cts.

The Graded Schedule of the National Board of Fire Underwriters as Applied to Water Systems. From a paper by A. M. Schoen. 4,000 words. Fire & Water Engineering, May 9. 10 cts.

Underwriters on Platoons. Leading insurance publication, the Spectator, says that platoon departments are now as good as under the old system. Effect on cost of fire protection. 1,000 words. Firemen's Herald, May 5. 5 cts.

Standard Schedule for Grading Cities and Towns of the U. S. with Reference to Their Fire Defences and Physical Conditions. Firemen's Herald, May 5. 1,200 words. 5 cts. May 12, 1,000 words. 5 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Street Cleaning and Refuse Collection Methods. A study of present methods of the department in Detroit, Mich., with recommendations for the improvement both of administration and of practical methods of street cleaning and refuse collection. 1 ill., 3,500 words. Municipal Journal, May 10. 10 cts.

Collection and Disposal of House Refuse. From a paper by C. H. Cooper, and discussion. 3,000 words. The Surveyor, May 11. 40 cts.

Street Cleaning in Jackson. Methods and cost. 700 words. Municipal Journal, May 31. 10 cts.

Intensive Street Cleaning Methods. By Richard T. Fox. 2,200 words. Municipal Journal, May 24. 10 cts.

(Continued on page 805.)

NEWS OF THE SOCIETIES

Calendar of Meetings.

June 11-14.—SOUTHWESTERN WATERWORKS ASSOCIATION. Annual convention, Topeka, Kan. Secretary, E. L. Fulkerson, Waco, Tex.

June 13-15.—NATIONAL ASSEMBLY OF CIVIL SERVICE COMMISSIONS. Annual meeting, Boston, Mass. Secretary, John T. Doyle, 1724 F St., N. W., Washington, D. C.

June 13-15.—MARYLAND STATE FIREMEN'S ASSOCIATION. Twenty-fifth annual convention, Cumberland, Md. Secretary, William Weagly, Westminster, Md.

June 20-22.—LEAGUE OF TEXAS MUNICIPALITIES AND TEXAS TOWN & CITY PLANNING ASSOCIATION. Joint Convention, Dallas, Tex.

June 20-22.—PENNSYLVANIA STATE CHIEFS OF POLICE ASSOCIATION. Fourth annual convention, Hotel Adelphi, Philadelphia, Pa.

June 20-22.—AMERICAN INSTITUTE OF CHEMICAL ENGINEERS. Semi-annual meeting, Buffalo, N. Y. Secretary, J. C. Olsen, Cooper Union, New York, N. Y.

June 25-27.—LEAGUE OF LOUISIANA MUNICIPALITIES. Annual convention, New Iberia, La. Secretary, Mayor Joseph B. Elam, Mansfield, La.

June 26-30.—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting, Atlantic City, N. J.

July 12, 13.—LEAGUE OF MICHIGAN MUNICIPALITIES. Annual convention, Grand Rapids, Mich. Secretary, Charles A. Sink, Ann Arbor, Mich.

July 24-27.—DOMINION ASSOCIATION OF FIRE CHIEFS. Annual convention, Port Arthur and Fort William, Ont. Secretary, James Armstrong, Chief, Fire Department, Kingston, Ont.

July 30-Aug. 3.—SOUTHERN SOCIOLOGICAL CONGRESS. Annual meeting, Blue Ridge, N. C. Secretary, J. E. McCulloch, 508 McLachlen Bldg., Washington, D. C.

Sept. 11-14.—NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention, Hartford, Conn. Secretary, Willard Kent, 715 Tremont Temple, Boston, Mass.

Sept. 27-29.—AMERICAN AND CANADIAN ENGINEERS AND ARCHITECTS OF NORWEGIAN BIRTH OR DESCENT. Informal congress and re-union, Chicago Norske Klub, Chicago, Ill. Chairman, Committee on Arrangements, Joachim G. Glaver, consulting engineer, Chicago, Ill.

Oct. 17-18.—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

Nov. 12-16.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, 469 Transportation Building, Chicago, Ill.

Nov. 20-23.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Recreation Congress, Milwaukee, Wis. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

American Medical Association.

Speaking on the anniversary of the beginning of the infantile paralysis outbreak in New York City in 1916, Dr. Haven Emerson, Commissioner of Health, told the members of the American Medical Association at a symposium on poliomyelitis at the Hotel McAlpin, New York City, of the plans that city has made to fight a recurrence of the disease. No positive remedy was recommended by the association, the physicians differing on the efficacy of the serum treatment advocated by sev-

eral physicians. Dr. Emerson surprised his hearers by the statement of the finding by his department that environment played no part in the diseases. He said that a more stringent and far-reaching quarantine would be used by the Health Department. Physicians who spoke before the joint session of three sections of the association differed widely as to the probability of a recurrence of the disease in this city in epidemic form.

Dr. Emerson said that a year ago the Baby Welfare Association notified the Health Department of six cases of infantile paralysis. Mothers had gone to the association and asked why their babies were so limp that they could not hold their bottles. The reason was that they were paralyzed. Dr. Emerson said it was quickly found that 114 more cases existed, but had not been reported. He urged that parents be instructed as to the necessity for reporting cases at once if they occur in the coming summer.

"Our ignorance a year ago as to the control of the disease was complete," said Dr. Emerson. "We obtained the advice we could and gave wide publicity to it. We stated to the public that there was a new and serious disease among us, and that we knew no way in which to control it. All doctors were urged to study the disease.

"We, as a department, have learned that there is no evidence that environment plays a part in the spread of the disease. Everything tends to confirm the theory that poliomyelitis spreads by personal contact like other diseases which are personal in their communication. Nothing was learned to indicate that unclean surroundings, dirt, or bad air had anything to do with the communication of the disease."

It is apparent, said the Commissioner, that children with normal throats are less susceptible to the disease than those with abnormal throats or those who have had trouble with adenoids or tonsils.

For this year, Dr. Emerson said, the Health Department would treat infantile paralysis, in so far as publicity goes, in the same way it treats scarlet fever and other contagious diseases—that is, that every morning the list of places where the disease breaks out will be posted in all schools and public institutions. The period of isolation for the disease this summer will be three weeks. A period of isolation of two weeks will be required of children under 16 years of age in households where a child is affected. If, after three weeks, a suspect continues to have discharges from throat and has fever, the period of quarantine will be extended. He said the members of families where there is infantile paralysis who are engaged in handling food will be forced to discontinue their occupation.

Dr. C. L. Dana, of New York, member of a joint committee of the New York Academy of Medicine and the Neurological Society, said it was believed by his committee that the period of greatest susceptibility to the disease was between the ages of 2 and 5. He said it had been established that direct communication from person to person was rare. To support this statement, he said the disease had not spread from ward to ward in hospitals, or from one child to others in the classrooms like other communicable diseases. Neurologists, he said, had the feeling that the disease was not personally contagious, but that it was believed infected persons could communicate the organism to certain agencies, such as insects and the lower animals. He said he believed in quarantine and commended the methods of the Health Department.

Dr. Charles Herrman, of New York, said that the sudden chart curves of the increases and decreases of the disease were evidence that the disease was very communicable or that there were a large number of carriers. Of the families exposed to infantile paralysis, he said, only 2 per cent contracted it, while in those families exposed to measles 96 per cent of the children contracted it, and 25 of those exposed to it contracted scarlet fever. It was his belief that in the 1916 epidemic the danger of communication was rather overestimated. He said he did not believe there was likelihood of another epidemic in this city for several years.

Dr. H. L. K. Shaw, of Albany, said it was generally recognized that the disease was transmitted by contact. He said that these lessons had been learned:

1. That the disease is communicable by contact.
2. The period of incubation is approximately seven days.
3. A quarantine of three weeks was adequate; a longer period would only work unnecessary hardship.

Dr. George Draper, of New York, also urged that serum therapy be given a trial, but Dr. Dana said he was not yet convinced that the serum was of any value. Several physicians announced in papers read before the convention the working out of serums they regarded as beneficial.

City Fire Marshals' Association of Texas.

The next annual convention of the City Fire Marshals' Association of Texas will be held at San Antonio in 1918. The fifth annual convention closed at the Chamber of Commerce and Manufacturers' Association of Dallas, June 5. The election of officers, the adoption of a patriotic resolution assuring President Wilson and the National Board of Fire Underwriters of every possible cooperation during the continuance of the war, and the adoption of the slogan of "Production and Prevention," characterized the closing session. Close cooperation between

Fire Marshals and the State Association of Volunteer Firemen was assured following a speech by W. P. Hallmark, of Dublin, fourth vice-president of the latter organization.

Mineral Wells, represented by J. T. Moore, and Victoria, represented by the retiring president, I. Cohen, were the only other bidders for the convention next year.

The new officers follow: John McKinney of McKinney, president; J. J. Daglish, of Tyler, first vice-president, and Frank F. Bennett, of Dallas, second vice-president. T. F. Baker, of Austin, was re-elected secretary-treasurer. Miss Lettie Hughes, of Austin, official reporter, was elected a life-time member and sponsor of the association.

(Continued on page 806.)

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

SEWERS are to be constructed by the village of Scarsdale, N. Y. Plans and specifications were prepared by Waring, Chapman & Farquhar, 874 Broadway, New York, N. Y.

WATERWORKS and SEWERS are to be constructed by Langdon, N. D., at a cost of \$50,000. The engineer for the work is T. R. Arnold, Leland Hotel, Minot, N. D.

Lewiston, Idaho, is to make some PAVING IMPROVEMENTS following the preparation of plans by Sawyer Brothers, engineers, White building, Seattle, Wash.

Cape Girardeau, Mo., is to build SEWERS to cost about \$300,000. The consulting engineer retained on the project is W. W. Horner, 5842 Julian avenue, St. Louis, Mo.

Altoona, Kan., is to make improvements to its WATERWORKS. The engineers are W. B. Rollins & Co., 209 Railway Exchange building, Kansas City, Mo.

Electrically operated S E W A G E PUMPING machinery is to be installed by Port Chester, N. Y. The consulting engineer for the improvement is James C. Harding, 170 Broadway, New York, N. Y.

Galveston, Tex., is continuing the rebuilding of its damaged CAUSEWAY. The consulting engineers for the project are the Concrete-Steel Engineering Co., Park Row building, New York, N. Y.

Tulsa, Okla., is to develop a BOULEVARD SYSTEM. The city has retained as consulting landscape architects Hare & Hare, Kansas City, Mo., and as consulting engineers, Brennan & Rooney, 25 Culbertson building, Tulsa, Okla., to work out the plans.

Waco, Tex., is to improve its SEWERS. The city has asked Henry Exall Elrod, Interurban building, Dallas, Tex., Bartlett & Ranney, San Antonio, Tex., and Burns & McDonnell, Interstate building, Kansas City, Mo., to prepare reports on the proposed project.

The states of North and South Dakota are suing the state of Minnesota for damages amounting to \$1,000,000, claimed to have been done by FLOODS on land in the Red River valley. Minnesota has retained as consulting engineer expert Frederick Bass, Minneapolis, Minn.

In improving its well WATER SUPPLY, Jamestown, N. Y., has the engineering services of C. C. Hopkins, 349 Cutler building, Rochester, N. Y.

Claremont, N. H., is to make some STREET and SEWER improvements. The consulting engineer is George P. Winn, Nashua, N. H.

Los Angeles, Cal., is to build new SEWERS. The plans and specifications for the work have been made by Olmsted & Gillelen, 1112 Hollingsworth building, Los Angeles, Cal.

SANITARY SEWERS are to be built by Warsaw, Ill., and Palestine, Ill., from plans which are being prepared by W. S. Shields, 8 South Dearborn street, Chicago, Ill.

Fayetteville, Tenn., is to make a number of STREET IMPROVEMENTS. The engineer for the work is Walter G. Kirkpatrick, 704 Farley building, Birmingham, Ala.

WATERWORKS to cost about \$25,000 will be built by Lineville, Ala. The engineers to prepare plans and specifications are J. B. McCrary Co., Third National Bank building, Atlanta, Ga.

Elizabeth, N. J., has been considering the advisability of building a municipal ELECTRIC PLANT. The consulting engineers retained to investigate, Runyon & Cary, Newark, N. J., have advised against such a course at the present time.

A \$1,200,000 CONCRETE VIADUCT is to be built by Summit County, Akron, O. Plans and specifications are being prepared by the engineers, Harrington, Howard & Ash, Orear-Leslie building, Kansas City, Mo.

Harrisburg, Pa., is considering the problems of REFUSE COLLECTION and DISPOSAL. The city has retained as consulting engineers to make a sanitary survey and recommendations Tribus & Massa, 86 Warren street, New York, N. Y.

Los Angeles, Cal., has begun extensive development of its PORT FACILITIES. The county had retained as consulting engineer to make plans Paul P. Whitham, Seattle, Wash., but his appointment as a Federal trade commissioner has forced him to give up the work and it is to be done instead by Carl H. Reeves, of Seattle.

PERSONALS

Ash, Louis R., of the firm of Harrington, Howard & Ash, has been made city engineer of Wichita, Kan.

Corning, Dudley T., has been appointed division engineer in the new bureau of street cleaning. He was formerly assistant engineer in the bureau of highways and street cleaning, which has been reorganized.

Gray, E. R., formerly deputy city engineer of Hamilton, Ont., has been appointed city engineer. He also has charge of the water works and the sewage disposal plant.

Hickok, Clifford E., has been appointed city engineer of Alameda, Cal.

Johnston, H., is no longer city engineer of Kitchener, Ont., B. E. Mitchell now holding that position.

C. E. Johnson and James S. McNair are now city engineer and street superintendent, respectively, of San Bernardino, Cal.

Lorraine, Grant M., was recently appointed city engineer of Alhambra, Cal. He previously served in the same capacity for the city of Orland, Cal.

McKnight, George, has resigned his position as city engineer of Frederickton, N. B.

Reed, George A., has resigned as city engineer of Montpelier, Vt., and will become assistant state engineer of Vermont.

Shenehon, Francis C., dean of the College of Engineering and head of the department of civil engineering, University of Minnesota, has opened offices in the New Metropolitan Bank building at Minneapolis and will devote his entire time to practice as consulting hydraulic engineer, in which capacity he has acted on large enterprises for a number of years.

Stewart, James R., of Cincinnati, has been selected by the Rapid Transit Commission of Cincinnati as a consulting engineer.

The state highway commission of Delaware will now have as its engineer Charles M. Upham, of Georgetown. He has been county engineer of Sussex County and engineer of the Coleman du Pont highway. George W. Francis, a civil engineer, has been appointed secretary of the commission.

Trumbull, Mark M., is now assisting George L. Farnsworth, superintendent of highways of LaSalle County and city engineer of Ottawa, Ill.

Ulrich, Edmund B., has been re-elected city engineer of Reading, Pa.

West, R. K., formerly assistant engineer with the State Highway Department of California, has been appointed highway engineer for Nevada.

Westcott, Frank M., has been appointed to fill the newly created office of Park Commissioner of Syracuse, N. Y. David Campbell has been made Park Architect.

Whitaker, Ralph W., is now city engineer of Bakersfield, Cal., having assumed the position of R. B. Ray.

BOOK REVIEWS

THE ACTIVATED SLUDGE PROCESS OF SEWAGE TREATMENT. By J. Edward Porter, 40 pages. General Filtration Company, Rochester, N. Y. Price 25 cents.

This is a bibliography on the subject, in which are listed 221 articles that have appeared in English and American technical periodicals and society proceedings during the three or four years since this process first came into notice. A brief abstract of each article is given. Included in the pamphlet is the nomenclature recommended by the committee appointed by the Pittsburgh conference a year ago and published in Municipal Journal a short time later. Also a short paper on the subject by Edward Bartow. It should be of great assistance to any who wish to investigate the subject by means of the published articles relating thereto.

MUNICIPAL INDEX

(Continued from page 802.)

Street Cleaning in Detroit. Methods employed and recommendations. Flushing, machine and hand sweeping and snow removal. Hired vs. Municipal teams. 2,500 words. Municipal Journal, May 31. 10 cts.

Flushing and Street Cleaning. From a paper by Raymond W. Parlin. 3,000 words. American Municipalities, May. 25 cts.

Western Cities Employ Vacuum Machines for Cleaning Streets. Costs given for operation of motor unit at Oakland, Cal. Best results where climate is dry. 3 ills., 1,000 words. Engineering News-Record, May 24. 15 cts.

Alcohol from Garbage. Possibility of conserving food products by producing 96,000 gallons of alcohol a year. Experiments at Columbus, Ohio, indicate a profit in utilizing garbage in this way. 1 ills., 2,500 words. Municipal Journal, May 24. 10 cts.

TRAFFIC AND TRANSPORTATION.

When Ship Freight by Motor Truck and When by Rail? Economic limit of truck haulage depends largely on freight house costs and on distance of local haul. By C. C. Williams. 1,500 words. Engineering News-Record, May 10. 15 cts.

Elevated Railway Rebuilt Without Stopping Traffic. Structure is raised to new grade, spans are changed and truss spans converted to plate-girder viaduct. 4 ills., 2,500 words. Engineering News-Record, May 17. 15 cts.

High Cost of Municipal Stable Attendance and Haulage and How to Reduce It. 1,800 words. Engineering and Contracting, May 16. 10 cts.

STRUCTURAL MATERIALS.

Placing Concrete in the Subway. Difficulties of introducing it in contracted spaces for tunnel lining. Concrete is forced several hundred feet through a pipe by pneumatic pressure. 6 ills., 1,800 words. Municipal Journal, May 31. 10 cts.

A Method of Proportioning Materials for Concrete. From a paper by H. C. Johnson. 2,250 words. The Surveyor, May 11. 40 cts.

Cement Grouting in Theory and Practice. Shaft sinking; water troubles; injecting cement; underground dams. 1 ills., 3,000 words. Water and Water Engineering, April 16. 40 cts.

Wet Concrete Pressure on Column Forms. Field and laboratory tests and their results. By A. B. McDaniel and N. B. Garver. 2 ills., 1,200 words. Concrete, May. 20 cts.

Concrete Consistency Measured by Simple Field Tests. Wet, mushy, or sloppy or soupy concrete determined by

WATER PURIFICATION. By Joseph W. Ellms. 485 pages, 150 illustrations. McGraw-Hill Book Co., Inc., 239 West 39th street, New York. Price \$5.

Mr. Ellms' name is familiar to those who keep posted in waterworks matters because of his contributions to the technical literature on water purification and his connection with the Cincinnati water filtration plant, of which he has been superintendent for a number of years. This work is by no means confined to the conditions, processes and results associated with the Cincinnati plant, however, but the author has drawn upon a large amount of the American literature on the subject as found in official reports, papers before technical societies and articles in technical periodicals.

The first 50 pages are general in their nature; the next 39 deal with coagulation and sedimentation; the following 278 with filtration, 70 pages with slow sand and 208 with rapid sand.

heap test. By Harold Thomas. 1 ills., 2,000 words. Engineering News-Record, May 3. 15 cts.

Effects of Water on Concrete. 1 ills., 2,000 words. Engineering News-Record, May 2. 10 cts.

Consistency of Concrete. Further evidence of weakening of concrete caused by excess of water. May reduce strength more than 80%. 1,500 words. Municipal Journal, May 24. 10 cts.

Gravel Deposits: Their Origin and Economic Developments. By Wm. Artin-gill. 3 ills., 3,000 words. Engineering and Contracting, May 16. 10 cts.

Determination of Proper Stopping Place in Driving a pile. 400 words. Engineering and Contracting, May 16. 10 cts.

I-Beams, Forming Main Verticals of Bulkhead, Make Hard Driving Into Limestone. In terminal work at Jacksonville steel beams driven as piles curled up under the hammer. By H. B. Mendenhall. 4 ills., 2,000 words. Engineering News-Record, May 10. 15 cts.

BRIDGES.

Inspection and Maintenance of Highway Bridges. By W. J. Carrel. 5 ills., 4,000 words. Better Roads & Streets, May. 15 cts.

Concrete Pile Trestle Bridges for Highways. 600 words. Municipal Journal, May 17. 10 cts.

Will Soon Complete Sciotoville Continuous Truss Bridge. Two 775-ft. spans of novel structure to be finished before June. Cantilever erection of Kentucky span progressing well. 3 ills., 1,000 words. Engineering News-Record, May 17. 15 cts.

Suspension Bridge Solves Problem of Crossing Rio Chiriqui in Panama. Highway crossing over river requires span of 410 feet. By A. S. Zinn. 4 ills., 1,250 words. Engineering News-Record, May 31. 15 cts.

Stone Bridges in French Battle Area Rapidly Rebuilt. Masonry arches are replaced by concrete arches without the use of falsework. 2 ills., 1,100 words. Engineering News-Record, May 10. 15 cts.

MISCELLANEOUS.

You Lose Seven Cents Every Minute Your Shovel Is Idle. To make biggest profits, train service, track shifting, water supply and other details should be arranged to keep steam shovels continuously at work. By Daniel J. Hauer. 2,000 words. The Contractor, May 25. 10 cts.

Three Trains Serving Steam Shovel Increase Output in Large Earth Cut. Good service track construction and maintenance eliminate derailment delays. Shovel passes across track without stopping traffic. 3 ills., 1,200 words. The Contractor, May 11. 10 cts.

Constructing Subway Excavation in Brooklyn. Interesting problems involved in digging two miles of open cut through a crowded metropolitan sec-

tion. 1,200 words. Excavating Engineer, May. 10 cts.

Gasoline Engine on Drag Line Excavator. Gives satisfactory service. 500 words. Engineering and Contracting, May 16. 10 cts.

Municipal Garage at Grand Rapids, Mich. Describes the garage and the accounting system. 2 ills., 1,100 words. Municipal Engineering, May. 25 cts.

Records of Official Surveys. Method devised by surveyor of Garden County, Nebraska. 2,500 words. Municipal Engineering, May. 25 cts.

Design of Storage Tanks for Economical Use of Materials. Dimensions to be used. By Arthur Jobson. 1,000 words. Engineering News-Record, May 3. 15 cts.

Ways and Means of Providing Working Men's Houses. By Perry MacNeillie. 3 ills., 1,200 words. The American City, May. 50 cts.

Logic for Engineers. The categories of energy. 2,500 words. Engineering and Contracting, May 9. 10 cts.

Logic for Engineers. An explanation of mental processes. By Halbert F. Gillette. 4,000 words. Engineering and Contracting, May 30. 10 cts.

Concrete Swimming Pools. Typical design and construction. Securing proper foundation drainage. 4 ills., 2,000 words. Concrete, May. 20 cts.

The Decimal System of Coinage, Weights and Measures. Continued from April 20 issue. 3,000 words. The Surveyor, April 27. 40 cts.

Mobilizing Unused Land and Forces to Meet an Unprecedented Crisis. Outline of some of the methods that are being used in applying the vacant lot and home gardening idea toward solving the problem of food shortage. 8 ills., 5,000 words. American City, May. 50 cts.

City Engineers Should Be City Planners. By Thomas Adams. 2,000 words. Engineering News-Record, May 3. 15 cts.

Engineering Economics. General features. 1,800 words. Engineering and Contracting, May 30. 10 cts.

Twin Mixer Plant Places Five Thousand Yards of Winter Concrete Each Month. Site requires 2 separated mixer plants. Shed for heating materials, canvas curtains and salamanders keep concrete from freezing. 6 ills., 2,500 words. Engineering News-Record, May 10. 15 cts.

Waste Paper Economics. By W. H. Maxwell. 500 words. The Surveyor, May 11. 40 cts.

Building Conditions in 32 States as Reported from Centers for Contractors' Supplies. 2 pages. Concrete, May. 20 cts.

Success in Selling the Contractor's Services Rests Upon the Contractor's Reputation. By Daniel J. Hauer. 2,000 words. The Contractor, May 11. 10 cts.

Road News by Portable Wireless. 1 ills., 500 words. Municipal Journal, May 10. 10 cts.

(Continued on page 806.)

INDUSTRIAL NEWS

Cast Iron Pipe.—Prices remain as high as last week. Quotations: Chicago—4-inch, class B and heavier, \$61.50; 6-inch, \$58.50. New York—4-inch, Class B and heavier, \$61.50; 6-inch, \$58.50. Birmingham—4-inch, class B and heavier, \$56; 6-inch, \$63; class A, \$1 extra. Lettings are being postponed because of high prices.

The Society for Electrical Development, Inc., New York City, has issued a new book with the title "Industrial Heating as a Central Station Load." The book covers the field of the various commercial uses and applications of electrical heating and deals with methods in this country. The high-temperature furnaces used in the metal industries and the different types of heaters which have shown such versatility in other industries are covered. The material is written in concise form for quick reference.

The Blaw Steel Construction Co., Pittsburgh, Pa., announces the appointment of G. E. Land to the position of advertising manager.

The Goodyear Tire & Rubber Co., Akron, O., has acquired a large tract of land in Arizona, near Phoenix, and has transformed 10,000 acres of cactus, sage and mesquite wilderness into one of the most interesting cotton plantation developments of the Southwest. The successful operation of this plantation, together with its cotton mills in Connecticut, will put the Goodyear Company in complete control of its fabric supply needs. Cotton experts have pronounced the long staple Egyptian cotton grown in the Salt River Valley, in Arizona, equal to any that has been produced abroad, and this is the verdict at the Goodyear Cotton Mills, at Goodyear, Conn., where samples of this Arizona cotton have been milled.

The American-La-France Fire Engine Co., Inc., Elmira, N. Y., announces the following recent shipments:

Sacramento, Cal., Type 40 Combination with Junior pump; San Buenaventura, Cal., Type 12 Comb., Junior pump; Omaha, Nebr., 2 type 45 triples; Mahanoy City, Pa., 2 Type 40 triples; Houlton, Me., Type 40 comb. with Junior pump; Wichita, Kans., Type 20 Comb. with Junior pump; Omaha, Nebr., Type 14 city service truck; Atlantic City, N. J., Type 10 comb. chem. eng. & hose car; Erie, Pa., Type 12 triple comb. chem. eng. & hose car; Bethlehem, Pa., Brockway Type D combination; Fargo, N. D., Type 12 Comb. chem. eng. & hose car; Walton, N. Y., Brockway Type B. Service truck; Elmira, N. Y., Type 12 triple comb. chem. eng. & hose car; Bethlehem, Pa., Type 41 triple comb. chem. eng. & hose car; Oakland Beach, R. I., Type 40 Comb. with Junior Pump; Omaha, Nebr., Type 14 City Service Trucks; Atlantic City, N. J., Type 10 Combination Chem. Eng. & Hose Car; Youngstown, Ohio, Type 12 Combination Chem. Eng. & Hose Car; Sewickley, Pa., Type 40 Comb. with Junior Pump; London, Ohio,

Type 40 Comb. with Junior Pump; Butte, Mont., Type 12 Comb. with Junior Pump; Deer Lodge, Mont., Brockway Type D combination chem. eng. & hose car; Omaha, Nebr., Type 14 City service truck; Garrett, Ind., Type 40 Comb. with Junior Pump; Highland Park, Mich., Type 12 Comb. Pumping Eng. & Hose Car; Susquehanna, Pa., Type 40 Hose car with Junior Pump.

Trucks in Indo-China.—An engineer in French Indo-China desires to purchase six or eight automobile trucks of 20 to 25 horsepower and with a capacity of 2½ to 2 metric tons, the weight not to exceed 5 tons loaded. Quotations should be made f. o. b. New York. Payment will be made one-half cash with order and the remainder on arrival of goods at destination. Correspondence should be in French. Inquiry should be made to the Bureau of Foreign and Domestic Commerce, Washington, D. C., and Opportunity No. 24629 referred to.

NEWS OF THE SOCIETIES

(Continued from page 804.)

At the morning session Tuesday the fire executives of Texas were assured of the co-operation of women's clubs and insurance underwriters in their contemplated campaign to reduce the fire loss in Texas through patriotic appeal. Mrs. P. P. Tucker, chairman of the fire prevention committee of the State Federation of Women's Clubs, expressed the belief that through proper education the waste amounting to \$250,000,000 annually in this country, as the result of fires, can be greatly reduced.

In a paper sent in by W. E. Malla-lieu, general manager of the Board of Fire Underwriters of New York City, the idea that all forces must co-operate with the National Government in the present crisis was strongly set forth.

In the round table discussion led by Secretary T. F. Baker on "How Fire Marshals Can Reduce Insurance Cost," the importance of strict co-operation of all city police and county officials in the prevention of fires was again stressed.

S. W. Inglish, of Austin, State Fire Marshal, spoke on "Needed Legislation." He said the fire loss of Texas is greater than any other place in the world. The loss each year averages \$3 per capita, while England, Europe's largest loser, has a record of only 33c. per capita, and Holland a loss only 11c. per capita per year. He said this evil can be corrected in a large measure by good laws.

"The value represented by our ash heaps each year is a scathing arraignment of our habits and a rebuke to our boasted civilization," he said. "This is made even a more severe indictment when we know more than 75 per cent of all fires in Texas are caused by carelessness and indifference on the part of our people.

"The enactment by our Legislature of the Fire Rating Board law in 1909 and the substitution of the act known

as the State Insurance Board law, and later the State Insurance Commission Act, all in the interest of rate making and fire prevention, were nothing more or less than protests against frightful impoverishment of the state by fire, and was intended to form a groundwork for a general scheme which when consummated and strengthened from time to time by additional legislation, was expected to solve to a great degree the question of our fire waste, equalize insurance rates and make possible cheaper indemnity."

Under the head of "Needed Legislation," he said Texas needs a building law that will make all buildings as near fireproof as possible; stricter laws for elimination of fire risks; uniform Fire Marshal law requiring close inspection at stated intervals, etc., were among those suggested as being desirable and necessary if Texas' fire loss is to be reduced.

Papers presented at the Tuesday forenoon session included "How Firemen Can Prevent Fires," Roger Byrne, president Volunteer Firemen's Association, Smithville; "Fire Prevention from the Underwriter's Viewpoint," Charles F. Thomas; "Co-operation Between the Fire Marshal and the Women's Clubs," Mrs. P. P. Tucker, chairman fire prevention committee, State Federation of Women's Clubs, Dallas; "How to Conduct a Fire Investigation," a round-table discussion, led by J. L. McClure, Fire Marshal of Wichita Falls; "How Fire Marshals Can Reduce Insurance Cost," a round-table discussion, led by Ira P. Wilson, Fire Marshal of Rogers.

At the Monday afternoon session these papers were presented: "Fire Prevention and Food Conservation," a round-table discussion, led by N. A. Moreland, Fire Marshal of Hallettsville; "How I Cleaned Up Palestine," John B. Allen, Fire Marshal of Palestine; "Fire and Panic Hazards of Theaters and Movies," a round-table discussion, led by W. P. McNeel, Fire Marshal of San Antonio; "Co-operation Between the City Fire Marshal and Special Inspectors of the State Insurance Commission," G. W. McKnight, special inspector, State Insurance Commission; "Fighting Fires Before They Start," W. E. Bideker, Chief of Fire Department, Fort Worth.

BOOK REVIEWS

(Continued from page 805.)

its importance. The various steps in purification processes, such as plain sedimentation, coagulation, filtration and disinfection, are described in considerable detail. Special chapters are devoted to water softening and to the removal of iron and manganese from ground water supplies."

The arrangement of the descriptive matter in logical order, so that a clear idea may be had of each process as a whole as well as in its details, has been carried out very successfully, and the descriptions are full and clear without being profuse.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
N. J.	Salem	June 15	3.5 miles 18-ft. concrete road.	Co. Engr.
Ind.	Anderson	10 a.m., June 15	Rocmac roads in two townships.	E. T. Flahavin, Co. Aud.
Tenn.	Cleveland	noon, June 15	51,000 sq. yds. asphalt, asphalt concrete, concrete or other paving; curbs and storm sewers.	Elmo Bartlett, City Recorder.
Ark.	Wynne	June 15	18½ miles gravel road construction, bridging, etc.	C. B. Bailey, Engr.
N. J.	Roselle Park	8.15 p.m., June 15	4,431 sq. yds. concrete pavement with bit. top; 2,500 ft. curb and headers and 1,350 cu. yds. grading.	J. Wallace Higgins, Boro Engr.
Tenn.	Lawrenceburg	2 p.m., June 15	Improving 3 roads, cost \$88,000.	R. M. Barker, Engr.
N. Y.	New York	2 p.m., June 15	Repaving with sheet asphalt and wood block; constructing curbs, etc.	Bureau of Highways, Municipal Bldg.
Wis.	Sheboygan	3 p.m., June 15	8,000 sq. yds. brick pavement, 22,625 sq. yds. reinforced concrete paving and 10,000 ft. combined curb and gutter.	Board of Public Works
N. J.	E. Rutherford	8 p.m., June 15	Paving with Tarvia macadam.	W. C. Ihnen, Boro. Engr., Rutherford
Minn.	Duluth	10 a.m., June 15	Improving Ramsey St.	J. A. Farrell, Comr. P. W.
La.	Glenwood	8 p.m., June 15	36,000 sq. yds. concrete, asphaltic concrete or brick and 32,000 ft. curb and gutter.	T. F. Delay, Engr., Creston.
Ind.	Crown Point	1 p.m., June 15	Slag, torpedo sand, screenings and broken stone.	Edward Simon, Co. Aud.
Cal.	Berkeley	10 a.m., June 15	Paving with concrete, with asphalt surfacing.	A. G. Briggs, City Clerk.
Tenn.	Knoxville	June 16	Grading and macadamizing road.	Co. Rd. Comn.
Ga.	Atlanta	June 16	100,000 sq. yds. first class paving.	City Engr.
W. Va.	Kingwood	noon, June 16	22.5 miles 15-ft. concrete roads.	H. E. Wilhelm, District Engr.
Mich.	Weston	2 p.m., June 16	Grading, macadamizing, draining and constructing bridges on 5.9 miles of road.	E. C. Breese, Twp. Clk.
Ind.	Indianapolis	10 a.m., June 18	Paving streets and resurfacing alleys; constructing sidewalk.	B. J. T. Jeup, City Engr.
Pa.	Johnstown	1.30 p.m., June 18	One mile brick or concrete roads near Geistown.	S. E. Dickey & Co. Engrs., Johnstown Tr. Bldg., Johnstown.
N. D.	Ft. Ransom	June 18	Paving bridge.	C. E. Best, Co. Aud., Lisbon
N. J.	New Brunswick	June 18	Road improvement.	A. B. Smith, Co. Engr., Perth Amboy
Wash.	Montesano	2 p.m., June 18	Clearing and grading roads.	G. D. Robertson, Co. Engr.
N. J.	Newark	2 p.m., June 18	Improving 5 streets in the county.	F. A. Reimer, Co. Engr.
N. Y.	Yonkers	8.30 p.m., June 18	Paving McLean Ave.	D. F. Fulton, City Engr.
Ont.	Toronto	June 18	Sidewalk on Oakwood Ave.	Frank Barber, Twp. Engr.
Neb.	Nebraska City	noon, June 18	Paving with brick, concr., asphalt concrete, or bit. mac.	M. C. Berry, City Clk.
Ill.	Champaign	3 p.m., June 18	Constructing brick pavement.	J. T. Boland, Supt. Streets
Mo.	Sedalia	5 p.m., June 18	Curbing and sidewalk construction.	E. L. Hackett, City Clk.
S. D.	Huron	1 p.m., June 18	5,300 sq. yds. pav., 2,330 ft. gutters and 1,400 ft. curbing.	O. A. Ricker, City Engr.
Minn.	St. Paul	10.30 a.m., June 18	Grading and curbing streets.	H. W. Austin, Pur. Agt.
N. J.	Camden	2 p.m., June 18	Paving with concrete.	City Engr.
Minn.	Elbow Lake	2 p.m., June 18	Road work; cost, \$9,250.	C. M. Nelson, Co. Aud.
Pa.	Morrisville	8.30 p.m., June 19	Oiling and resurfacing streets.	T. B. Fowler, Boro. Secy.
Utah	Salt Lake City	10 a.m., June 19	Grading, paving and curbing.	Gordon Snow, City Recorder.
N. J.	Ridgewood	8 p.m., June 19	27,000 sq. yds. concrete or bituminous concrete.	W. Simonds, Engr.
N. J.	Wildwood	June 19	Rebuilding Holly Beach Rd.	Co. Engr., Cape May.
Mont.	Laurel	8 p.m., June 19	2,800 ft. cement sidewalks.	City Clerk.
Minn.	Ely	8 p.m., June 19	33,270 ft. cement sidewalks and crossings; 4,660 ft. curb and gutter, 9,500 ft. storm sewers.	Arthur Knutson, City Clk.
Ind.	South Bend	10 a.m., June 19	Paving on Milton Ave.	Bd. of Public Wks.
N. Y.	Amsterdam	8 p.m., June 19	7-in. concrete pavement.	T. J. Hazlett, City Clerk
Wash.	South Bend	10 a.m., June 19	Constr. timber trestle and macadamizing road.	C. S. B. Henry, Co. Engr.
N. J.	Belvidere	June 19	Paving Washington-Oxford Road.	Board of Freeholders
N. C.	Clinton	noon, June 19	11,000 sq. yds. sheet asphalt, concrete or other pavement.	W. M. Platt, Engr., Durham
N. J.	Bridgeton	8 p.m., June 19	8,064 sq. ft. concrete gutters.	City Engr.
N. J.	W. Orange	8.15 p.m., June 19	Laying concrete or stone walks.	G. W. Foster, Town Clerk.
Minn.	Minneapolis	3 p.m., June 19	100,000 sq. yds. creosoted yellow pine paving blocks.	K. E. Alexander, City Pur. Agt.
Pa.	West York	2 p.m., June 20	2,870 sq. yds. asphalt on concrete base.	R. B. McKinnon, Boro. Engr., York, Pa.
Ill.	Mokena	10.30 a.m., June 20	5,330 sq. ft. 10-ft. macadam road.	County Highway Supt., Joliet.
Pa.	Elton	June 20	.5 miles of permanent highway, brick or concrete.	O. P. Thomas, Engr., Leader Bldg., Johnstown.
Pa.	Reading	10 a.m., June 20	21,000 sq. yds. sheet asphalt resurfacing and repair and 2,750 sq. yds. brick paving and resurf.; plans, \$10.	E. B. Ulrich, City Engr.
N. J.	Belvidere	10.30 a.m., June 20	4.1 miles bit. mac. paving.	H. W. Vetter, Co. Engr.
Ok.	Mingo Junction	noon, June 20	Paving, curbing, sidewalks and sewers.	G. E. Fithen, Village Clerk
Ark.	Pine Bluff	10 a.m., June 20	40 miles bit. mac. roads.	Humphreys & Tovey, Engrs.
N. Y.	Brooklyn	11 a.m., June 20	Paving with asphalt, curbing and laying sidewalks; 60,000 asphalt paving blocks.	Bur. of Hwys., 50 Court St.
N. Y.	L. I. City	11 a.m., June 20	300 tons hydrated lime; grading, curbing, and paving with asphalt; sidewalks.	M. E. Connolly, Boro. Pres.
N. Y.	New York	10.30 a.m., June 20	Paving with bit. concr. and asphalt, and laying walks.	Douglas Mathewson, Pres. Boro. Bronx.
Ok.	New Junction	June 20	Grading, paving and curbing.	Village Clerk.
N. J.	Belvidere	10.30 a.m., June 20	.4 miles bit. mac. road.	Bd. of Chosen Freeholders.
Va.	Norfolk	1 p.m., June 20	Paving between car tracks.	City Engr.
Pa.	Lebanon	5 p.m., June 21	11,200 sq. yds. wood, brick, bitulithic or Topeka on 5-in. concrete base; specifications, \$5.00.	A. Volcker, City Engr.
Ind.	Crown Point	1 p.m., June 21	Constructing gravel roads.	Edward Simon, Co. Aud.
Ga.	Griffin	11 a.m., June 21	60,000 sq. yds. bit., asphalt, concrete or bit. concrete paving; 43,000 ft. granite curb; 21,000 cu. yds. grading.	Solomon-Norcross Co. Engrs., Atlanta.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N. J.	Newark	3:30 p.m., June 21	Paving with recliipped granite block, asphalt or brick: setting curbs, etc.	M. R. Sherrerd, Ch. Engr.
Pa.	Philadelphia	June 21	Paving with sheet asphalt, brick, granite block and water bound and bituminous macadam, curbing, and improving parkways and avenues. Total cost, \$675,000.	Fred. C. Dunlap, Chief, Bureau Highways and Street Cleaning.
Cal.	Sacramento	10 a.m., June 22	Improving county highways.	County Highway Comm.
La.	Gretna	June 25	Paving with bitulithic and granite block.	John Ehret, Mayor.
Cal.	Sacramento	June 25	48.9 miles state highway.	State Highway Commission.
Wash.	Olympia	2 p.m., June 25	1.8 mile grading and surfacing.	State Highway Comm.
La.	Crowley	noon, June 26	70 miles hard surfaced road.	Board of Parish Supervisors
N. J.	Rahway	8 p.m., June 26	Furnishing and setting 710 ft. blue stone curbing and re-setting 2,349 ft. old curb.	Franklin Marsh, City Engr.
Tenn.	Fayetteville	June 26	12,000 sq. yds. wood, brick, asphalt or concrete pavement; curbs and sewers	W. G. Kirkpatrick, Engr., Farley Bldg., Bmghm., Ala.
O.	Orrville	June 27	Improving S. Main St.	A. Jenny, Village Clerk
Ind.	Indianapolis	10 a.m., June 28	Constructing roads	L. K. Fesler, Co. Aud.
La.	Kinder	10 a.m., June 28	Constr. all proposed highways in Allen parish.	W. L. Stevens, Engr., Whitney-Central Bank Building, New Orleans.
Pa.	Newport	7 p.m., June 29	Paving with brick, streets in several villages.	W. S. Norton, Twp. Engr., Alden Sta., Pa.
O.	Ashtabula	1 p.m., July 2	Paving roads	County Surveyor.
W. Va.	Hamlin	July 2	.6 miles of road and two bridges.	A. F. Black, Co. Clerk.
Md.	Frederick City	1 p.m., July 2	4.38 miles state aid road.	F. M. Stevens, Pres. Co. Commissioners.
Ind.	Williamsport	2 p.m., July 2	18,364 ft. gravel roads.	D. H. Moffitt, Co. Auditor
Ind.	Nashville	1 p.m., July 2	Three stone and gravel and one concrete roads.	Omer Morrison, Co. Auditor
Ind.	Brazil	10:30 a.m., July 2	Stone and gravel roads	W. O. Graesser, Co. Aud.
Ind.	Rochester	2 p.m., July 3	Constructing township road	E. A. Smith, Co. Aud.
Ind.	Bloomfield	2 p.m., July 3	Gravel roads	G. E. Kidd, Co. Aud.
Ind.	Salem	1:30 p.m., July 3	16,775 ft. road work	E. E. Batt, Co. Aud.
Ind.	Albion	2 p.m., July 3	Brick road	G. A. Young, Co. Aud.
Ind.	Greenfield	10 a.m., July 3	Four gravel and brick roads.	H. J. Rhue, County Aud.
Ind.	Rensselaer	2 p.m., July 3	Constructing three roads.	J. P. Hammond, County Aud.
Ind.	Marion	2 p.m., July 3	Constructing gravel road.	Mort McRae, County Aud.
N. H.	Claremont	July 6	8,000 sq. yds. Topeka pavement, 2,000 ft. concrete curb, and 1,000 ft. sewers.	G. P. Winn, Engr., Nashua, N. H.
Minn.	Duluth	July 9	Improving 8.5 miles road.	Odin Halden, County Aud.
Ind.	Rochester	2 p.m., July 14	Gravel road	E. A. Smith, Co. Auditor
Ind.	Shelbyville	July 17	Cement sidewalks	W. S. Jones, City Clk.
Ida.	Lewiston	Aug. 13	95,000 sq. ft. concrete walks, 21,000 ft. concrete curb and 23,000 cu. yds. grading.	C. F. Leland, City Clerk
SEWERAGE.				
N. Y.	New York	2 p.m., June 15	Altering receiving basin.	Bureau of Sewers, Municipal Bldg.
Tenn.	Cleveland	noon, June 15	Storm sewer construction	Elmo Bartlett, City Recorder.
La.	Algona	June 15	Constructing drainage ditches.	W. Wendt, Drainage Clerk
Minn.	Waconia	June 15	14,200 ft. 8 to 18-in. tile drains.	Henry Bahr, Town Clk.
Wis.	Sparta	3 p.m., June 15	Constructing small sewer	F. C. Thome, Sewer Commr.
Ont.	Toronto	June 18	Constructing sewers	Frank Barber, Twp. Engr.
N. D.	Bismarck	8 p.m., June 18	Constructing storm sewers	C. L. Burton, City Aud.
Minn.	Princeton	7 p.m., June 18	2,000 ft. sewer and water main.	Clifton Cravens, Vil. Rec.
Kans.	Neodesha	7:30 p.m., June 18	Storm sewer; cost, \$5,000.	Black & Veatch, Engrs., Interstate Bldg., Kansas City, Mo.
Minn.	St. Paul	10:30 a.m., June 18	Storm water sewer	H. W. Austin, Pur. Agt.
La.	Marshalltown	9 a.m., June 18	Constructing vitrified and segment block sewers, 15 to 48 inches; 7,000 ft. approximately.	O. A. Rosengren, City Clerk
La.	Creston	8 p.m., June 18	300,000-gal. Imhoff tank, filter beds and outfall sewer extensions. (Former bids rejected.)	T. S. DeLay, City Engr.
N. J.	Camden	8 p.m., June 18	Sewers and water and sewer connections.	City Engr.
Ind.	Indianapolis	10 a.m., June 18	Constructing local sewer.	B. J. T. Jeup, City Engr.
N. Y.	New Brighton	noon, June 19	255 ft. 8-in. vit. sewers.	Bur. of Engineering.
Minn.	Ely	8 p.m., June 19	9,590 ft. 15 to 36-in. storm and sanitary sewer.	Arthur Knutson, City Clk.
Ind.	Garrett	7:30 p.m., June 19	24 to 48-in. sewers	C. U. Bowers, City Clk.
Utah	Salt Lake City	10 a.m., June 19	Constructing and extending sewers	Gordon Snow, City Recorder.
O.	Akron	11 a.m., June 19	Storm water sewer.	Margaret Rebel, Clk., County Commrs.
N. J.	Newark	June 19	Foundation for pumping station, etc.	Passaic Valley Sewerage Comm.
Pa.	Reading	10 a.m., June 20	2,772 ft. 20-in. sewer; 1,000 ft. tunnel backfill, manholes, etc.; plans, \$15.	E. V. Ulrich, City Engr.
N. Y.	Scarsdale	8 p.m., June 20	Constructing lateral sewers	Waring, Chapman & Farquhar, Engrs., 874 Broadway, New York.
Mich.	Ann Arbor	June 20	13,371 ft. 8 to 30-in. vit. and segment block sewers.	City Engr.
N. Y.	L. I. City	11 a.m., June 20	Sewers in several streets.	M. E. Connolly, Boro Pres.
Mo.	Mexico	2 p.m., June 20	Sewage disposal plant and sewers.	Black & Veatch, Interstate Bldg., Kansas City, Mo.
N. Y.	New York	10:30 a.m., June 21	Constructing sewers	Douglas Mathewson, Pres. Boro. Bronx.
Minn.	Ortonville	10 a.m., June 22	Tile drainage ditches	A. V. Randall, Co. Aud.
Wis.	Hillsboro	7 p.m., June 22	4,127 ft. 6 to 12-in. sewers.	W. G. Kirchoffer, Engr., Madison, Wis.
Ind.	Kokomo	June 25	Constructing 8-in. sewers	Bd. of Public Wks.
N. Y.	Syracuse	1:30 p.m., June 25	41,355 ft. 6 to 36-in. sewers, 67 manholes, 1 sedimentation basin and 31 catch basins.	R. D. Rooney, Sec. Bd. of Contract & Supply.
N. J.	Newark	9:30 a.m., June 26	Foundations and connections for Yantacaw pump. stat'n.	Passaic Valley Swge. Comrs.
Va.	Roanoke	noon, June 26	Constructing sanitary sewer.	F. L. Gibboney, City Engr.
Minn.	Benson	2 p.m., June 26	Tile drainage ditches; cost, \$50,000.	C. L. Kane, Atty.
Ind.	Hartford City	2 p.m., June 26	Constructing drainage ditch.	Fred. Glancy, Co. Surv.
N. J.	Newark	June 26	Generators and engines	Passaic Valley Sewerage Comm.
Ill.	Chicago	June 28	Pumping equipment at Calumet sewage pumping station.	John McGillen, Clerk, Sanitary Dist. of Chicago.
Ind.	Bloomington	7:30 p.m., June 29	Constructing sanitary sewers.	G. A. Davis, City Clerk
N. D.	Fessenden	July 1	Constructing water works and sewer system.	T. R. Arnold, Engr., Minot.
N. D.	Leeds	July 1	Water works and sewers; cost, \$35,000.	T. R. Arnold, Engr., Minot.
Minn.	Pine City	7:30 p.m., July 1	1,750 ft. vit. sewers	J. F. Druar, Engr., Commercial Bldg., St. Paul.
Ariz.	Flagstaff	July 3	Sewer extensions: \$55,000 available.	A. A. Johnson, City Clerk.
N. H.	Claremont	July 6	1,000 ft. of sewer 6 ft. deep.	G. P. Winn, Engr., Nashua, N. H.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N. J.	Newark.....	July 10..	Foundations and c'n'ctions for pump. sta. in Wallington..	Passaic Valley Swge. Comn.
Minn.	St. Cloud.....	9 a.m., July 20..	8,850 ft. tile drains	Nicholas Thomey, Co. Aud.
Okla.	Billings	Aug. 1..	Sewer, waterwks. system and light. plant; cost, \$60,000..	L. Pantan, Pres. Bd. of P. W.
WATER SUPPLY.				
Mich.	Niles	June 15..	Laying 4,900 ft. 4 to 8-in. water pipe and 1,000 ft. 10-in. sewers	Board of Public Works.
Wash.	Marshall	June 15..	Well at school	L. Orland, Clerk, School Dist. No. 6.
Minn.	Duluth.....	11 a.m., June 15..	Laying water mains	P. G. Phillips, Comnr. P. Wks.
N. D.	Fargo	10 a.m., June 15..	Laying 6-in. water mains.....	A. R. Watkins, City Aud.
Mo.	Kansas City	June 13..	2,210 tons c. i. pipe.....	W. C. Weaver, Pur. Agt.
O.	Bradford	June 18..	Pump well, pumping station, 40-h.p. gas engine, 450-gal. triplex pump, etc.	A. Elliot Kimberly, Engr., 8 E. Long St., Columbus, O.
N. Y.	New York.....	2 p.m., June 18..	Hauling and laying water pipe.....	Wm. Williams, Comrs. Water Supply, Gas & Electricity.
Minn.	Princeton.....	7 p.m., June 18..	Laying 2,000 water and sewer mains.....	Clifton Cravens, Vil. Rec.
O.	Wadsworth	June 18..	1,500,000-gallon filter plant	R. Buckley, Engr.
Sask.	Swift Current.....	5 p.m., June 19..	800-gal. synchronous motor-driven centrifugal pump, for 300-ft. head.....	G. D. Arnott, City Clerk.
Mass.	Boston	noon, June 19..	High-pressure water pipe laying.....	E. F. Murphy, Comr. P. W.
Minn.	Ely	8 p.m., June 19..	Laying 143.5 tons 6-in. c. i. pipe.....	Arthur Knutson, Vil. Clerk.
Minn.	Minneapolis.....	3 p.m., June 19..	Furnishing 24 fire hydrants, thirty-six 6-inch hub end gate valves, and ten 8-inch gate valves.....	City Purchasing Agent
N. Y.	Buffalo.....	11 a.m., June 22..	Furnishing hydrants and valves for one year.....	A. W. Kreinheder, Comr. Public Works.
Ariz.	Wickenburg ...	8 p.m., June 23..	Installing electric lighting system and extending and improving water system	H. P. Ward, Town Clerk.
Va.	Lynchburg	noon, June 25..	Constructing filtration plant, etc.....	H. L. Shaner, City Engr.
Mont.	Livingston.....	3 p.m., June 26..	Pumping station, concr. reservoir, pipe, and 3,000,000-gal. filter unit	Burns & McDonnell, Engrs., Interstate Bldg., Kan. City, Mo.
N. D.	Fessenden.....	July 1..	Sewers and water works system; cost, \$55,000.....	T. R. Arnold, Engr., Minot.
N. D.	Leeds	July 1..	Water works and sewers; cost, \$35,000.....	T. R. Arnold, Engr., Minot.
N. D.	Hazen	8 p.m., July 2..	Waterworks system	Geo. Freer, Vil. Clk.
Minn.	Duluth.....	11 a.m., July 10..	20,000,000 gals. electric cent. pump.....	P. G. Phillips, Comnr. P. W.
Ind.	Portland	9 a.m., July 10..	Water filtering and softening plant, walks, etc., at new Court House	John Bonifas, Co. Aud.
N. Y.	New York.....	11 a.m., July 17..	Shandaken tunnel, 18 miles long and 10 ft. 3 ins. x 11 ft. 6 ins., lined with concrete	Bd. of Water Supply, Municipal Bldg., New York.
Okla.	Billings	Aug. 1..	Waterworks, light. and sewer systems; cost, \$60,000....	L. Pantan, Pres. Bd. of P. W.
MISCELLANEOUS.				
Ia.	Mason City	2 p.m., July 15..	Constructing drains	G. E. Frost, Co. Aud.
Ohio	Cincinnati	10 a.m., June 16..	6,600 bbls. Portland cement, 6,600 yds. gravel and 3,300 yds. sand	U. S. Engineers.
Ind.	Frankfort	2 p.m., June 16..	Constructing drainage ditch	W. E. Lowman, Drain. Comr.
Ind.	Danville	2 p.m., June 16..	Constructing drainage ditch	C. E. Higgins, Constr. Comr.
Ala.	Montgomery.....	June 16..	14,000 bbls. Portland cement.....	U. S. Engineer Office.
Ind.	Otwell	10 a.m., June 18..	Constructing dredge ditch	S. Spiker, Engr., Vincennes.
N. Y.	Tompkinsville.....	June 18..	Gas mantles, acetylene gas and fire hose.....	Light House Inspector.
La.	Opelousas	noon, June 18..	42 miles ditch excavation.....	C. F. Boagni, Pres.
Md.	Baltimore.....	2 p.m., June 18..	3,500 lineal feet creosoted piles.....	Lighthouse Inspector.
Pa.	Wilkes-Barre	noon, June 19..	125 portable traffic standards	F. H. Gates, City Clerk.
Ind.	Munsey	1 p.m., June 19..	Cleaning and repairing ditch	A. A. Hamilton, Twp. Trus.
Mo.	St. Louis	noon, June 19..	Superheaters for pumping station, four 350-h.p.....	E. R. Kinsey, Pres. Bd. P. S.
Minn.	So. St. Paul.....	8 p.m., June 19..	Two automatic stokers; laying steam mains and conduits.....	J. R. Stevenson, Secy. Bd. Ed.
N. Y.	New York.....	noon, June 20..	Fifty snow plows and 75 hose reels.....	J. T. Fetherston, Comnr. St. Cleaning.
N. Y.	L. I. City.....	11 a.m., June 20..	Final disposal of garbage, rubbish and ashes.....	M. E. Connolly, Boro Pres.
Tex.	Galveston	June 20..	Grading, filling and riprapping, at Fort Crockett.....	U. S. Engr. Office.
Minn.	Chaska	June 22..	Ditching and fencing; cost, \$13,700.....	J. B. Connolly, Co. Aud.
N. Y.	Newark.....	noon, June 22..	Two boilers, piping, stokers, etc., at asylum.....	L. F. Pilcher, State Archt., Albany, N. Y.
Wash.	Seattle	10 a.m., June 25..	Sale of two 2-ton Troy dump wagon trailers.....	Board of Co. Comrs.
N. Y.	Albany.....	noon, June 26..	Constr. movable dam to replace Dam 14 at Herkimer....	W. W. Wotherspoon, Supt. Public Works.
Mich.	Detroit	June 30..	Machinery and valves for Fourth Lock, St. Mary's Falls Canal	U. S. Engr. Office.
N. D.	Mott.....	2 p.m., July 2..	1 large grader, 6 road drags and 6 Fresno or Buck scrapers	E. C. Roberts, Co. Aud.
Tenn.	Memphis	July 2..	Furnishing concrete mixer, engines, belt elevators and conveyors, etc.	Miss. River Comn.

STREETS AND ROADS.

Birmingham, Ala.—Ordinance requiring the paving of Second Ave. from 19th to 21st Sts. passed.

Edmonton, Alta.—City Council plans construction of sidewalks to cost \$5,000. A. W. Haddow, Acting City Engineer.

Fort Smith, Ark.—The First Natl. Bk. of Fort Smith purchased paving district No. 12 \$11,000 bonds.

Fresno, Cal.—City granted application of the Pacific Improvement Co. to lay 5-ft. sidewalks on Varrue Ave., and 6-ft. sidewalks on Kerckhoff, with cement curbing, and also for cement sidewalks and curbing in East Fresno.

Los Angeles, Cal.—Maps approved for the improvement of Cahuenga Ave. between Curley St. and Whitley Ter., and for the improvement of Orchid Ave. from 59 ft. southerly from Fifth St. to Franklin Ave. and other streets.

Marysville, Cal.—Board of Supervisors authorized County Surveyor Crook to solicit bids for the grading of the Marys-

ville-LaPorte highway at Nigger Jack Slough; estimated cost \$1,300. Later a bridge will be constructed.

Redding, Cal.—Supervisors voted to grant the petition of Copper City and Heroult and build a road from Copper City along the north side of Pit River through Heroult to a junction with the State Highway near the Baird fishery. The road will be 7 miles in length. It will cost \$3,000 and the bridge across McCloud River \$6,500 more.

San Diego, Cal.—City will improve Arguello St., Hickory St., Arden Way and 4th St. Allen H. Wright.

San Jose, Cal.—Plans and specifications for improvements on Market St. between the north line of San Fernando St. and the south line of Market St., were approved and bids will be asked for.

Perry, Fla.—Taxpayers voted in favor of issuing \$75,000 street paving bonds.

Tampa, Fla.—Board of Public Works granted permission to have the curb set back several feet on the north side of Henderson Ave., between Franklin St.

and Florida Ave., and to round off the corners in this block.

Tampa, Fla.—Hillsboro County Citrus Park Rd. district bonds of \$100,000 were not sold. W. P. Culbreath, Clk. County Comrs.

Salmon, Ida.—Messrs. Keeler Bros. of Denver and the Pioneer Bank & Trust Co., of Salmon, jointly purchased the \$150,000 road improvement bonds. J. L. Kirtley, Jr., Lemhi Co. Clk.

Albion, Ind.—The Farmers & Merchants Bank of Laotto, Ind., was the successful bidder for a \$19,000 issue Noble county road bonds.

Angola, Ind.—Fletcher American Bank, Indianapolis, bought two issues of Steuben county road bonds—\$4,950 and \$6,360—at a premium of \$5.10.

Cannelton, Ind.—Bids received June 22, 1917, at 12 M., by Treasurer Perry county for sale \$9,350 highway improvement bonds, 4½ per cent., 10 years. Lawrence P. Kelly, Treasurer.

Frankfort, Ind.—Three issues Clinton county highway bonds, in amounts of

\$2,800, \$2,160 and \$2,720 were sold to J. F. Wild & Co., of Indianapolis.

Goshen, Ind.—W. A. Winship, treas. Elkhart County, sold a \$23,400 issue highway bonds to W. H. Charnley, of Goshen, Ind., for \$370 premium. Bonds bear 4½ per cent, and cover period of 10 years.

Hartford City, Ind.—The \$3,600 bond issue for the construction of the Blount Rd. was awarded to I. M. Miller or a premium of \$62.

Hartford City, Ind.—Bids received July 2, 1917, at 12 M., by Treasurer of Blackford county, for sale \$35,000 highway improvement bonds, 4½ per cent, 10 years. John Hasson, Treasurer.

Indianapolis, Ind.—Gavin L. Payne & Co., Indianapolis, were successful bidders for road bonds, offering par, accrued interest and \$9.10 premium.

Indianapolis, Ind.—Board of public works adopted resolutions for permanent improvements on Guilford Ave. from 42d to 46th; first alley east of Delaware from 29th to 30th; first alley east of Ruckle from 32d to 33d; Winthrop Ave. from 42d to 46th, and Dawson St. from Lexington to Woodlawn, curb and brick gutters and cement walks.

Mt. Vernon, Ind.—Mt. Vernon National Bank took an \$8,200 issue of Posey county road bonds on a premium bid of \$70.10, and a \$3,300 issue went to the First National Bank of New Harmony on a premium bid of \$35.

Paoli, Ind.—Orange county highway bonds, an issue of \$4,000 4½ per cent, 10 years, were awarded to the Orange County Bank, of Paoli, Ind.

Plymouth, Ind.—Marshall county road improvement bonds, \$8,600, 4½ per cent, 10 years, were sold to Gavin L. Payne & Co., of Indianapolis.

Princeton, Ind.—Two issues of Gibson county road bonds, \$4,640 and \$17,520, were sold to the Farmers Bank, Princeton, Ind.

Rochester, Ind.—Fulton county road improvement bonds to amount of \$16,000 were sold to O. B. Smith of Rochester, Ind.

Shoals, Ind.—Bids received June 23, 1917, at 12 noon, by treasurer of Martin county, for sale \$8,000 highway improvement bonds, 4½%, ten years. Wm. T. Baker, treasurer.

Terre Haute, Ind.—Vigo county highway construction bonds totaling \$107,500 have been sold to J. F. Wild & Co., of Indianapolis, by County Treasurer Messick. The \$56,000 issue for the Nathan G. Wallace Rd. brought a premium of \$29, the \$444,000 issue for the Ed Sparks Rd., \$31; \$3,300 issue for the W. S. Ferree Rd. and the \$13,200 issue for the A. Carter Rd. brought \$1 each.

Terre Haute, Ind.—Council appropriated \$1,000 for the purpose of repairing the intersectional pavement at 8th and Chestnut Sts., and for the resurfacing of North 7th St. with asphalt from Cherry St. to the Big Four R. R.

Versailles, Ind.—Ripley county highway bonds to amount of \$10,600 were sold to the Napoleon State Bank for premium of \$125. Bonds bear 4½% and run for 10 years.

Hutchinson, Kan.—City Commission order paving of North Adams, from Santa Fe to 23d St., about 20 blocks; First Ave. east, Walnut to Bismarck St., 8 blocks; 18th Ave. west, Main to Adams, two blocks; North Washington St., 18th to 19th, one block; alley back of Public Library, between Fourth and Fifth, one block; curb and gutter, 13th Ave. west, Main to Monroe, five blocks; gutter 14th Ave. west, Main to Washington, one block.

Cameron, La.—Cameron Parish voted in favor of issuing \$13,000 road bonds.

Haverhill, Mass.—Mayor Leslie K. Morse has plan in mind to make 50 and 60 ft. wide thoroughfare of Fleet St. and Court St., to relieve congestion of traffic.

Mt. Clemens, Mich.—As a military necessity the war preparedness board has been asked by a committee of business men to appropriate \$75,000 for the construction of a bridge and two miles of macadam runs with the new government aviation road connecting the city of Mt. Clemens which will be constructed by the war department at a cost of \$1,000,000.

Duluth, Minn.—The good roads committee of the agricultural division of the Duluth Commercial Club will make an effort to have established a system of trunk roads and secondary trunk roads throughout this county, and will prob-

ably ask the county board to aid in the work.

Minneapolis, Minn.—City passed resolutions for construction of artificial curb and gutters in various streets.

Nashauk, Minn.—Village Council planned for sidewalks and curbs on Fourth St. and Central Ave. from Third to Fourth St., the work to commence in about a month.

St. Paul, Minn.—State Highway Commission is considering plans and arranging to advertise for bids on the construction of sections of the Twin Cities-Duluth highway and County Commissioners are outlining extensive improvement plans.

Dudley, Mo.—City plans to pave number of streets. C. A. Hall, Clerk.

Joplin, Mo.—Council ordered Sergeant Ave. paved from First to Fourth St. with asphaltic concrete.

Sedalia, Mo.—City plans to pave 12,000 yds. 13th St., concrete. F. T. Leaming, Engr.

Butte, Mont.—City granted petition of residents of West Granite for grading of the street.

Sedalia, Mo.—Resolution was passed providing for the paving and grading of the alleyway between 4th and 5th Sts. and Ohio and Osage Aves.

Sedalia, Mo.—Resolutions were introduced for the construction of sidewalks in various parts of the city.

Reno, Nev.—Gov. Stephens of California signed, according to Secretary Raymer of the Commercial Club from Matthews, the Matthews bill appropriating \$60,000 for the building of roads in Lassen county. The principal highway to be repaired will be the one from Susanville to Reno.

Summit, N. J.—City plans to pave Summit Ave., concrete or other material. O. J. Swenson, City Engr.

Trenton, N. J.—City street improvement work, under way, contracted for or contemplated for this season, will total more than \$100,000. Much work is now being done, while other improvements will soon be commenced and completed as rapidly as possible.

Albany, N. Y.—Governor Whitman has signed the following bills in Oneida Co.: Assemblyman Davis' appropriations, \$15,000 for a new steel bridge over the Black River Canal in East Whitesboro St., Rome; also \$2,500 for paying the state's share of paving the same street adjoining the Erie Canal; Assemblyman Martin's reappropriation for constructing approaches to the Erie Canal Bridge at Yorkville for foot and vehicular traffic; Senator Sage's \$100,000 for highway improvement between Albany and New York.

Amsterdam, N. Y.—City planned to pave and curb Cherry St.

Amsterdam, N. Y.—City rejected the only bid received for grading of Bartlett St. from Vrooman Ave. to Pulaski; will readvertise.

Gloversville, N. Y.—City plans to repair walks 28, 39 and 89 East State St.

Goshen, N. Y.—Messrs. Crandell, Sheperd & Co., of New York, were the successful bidders for the \$150,000 road bonds. Thos. J. Gibson, Orange County, Treasurer.

Herkimer, N. Y.—Board of Supervisors appropriated \$1,120 for the completion of the road from Little Falls to Fairfield.

St. Johnsville, N. Y.—Taxpayers voted in favor of issuing \$33,000 and \$7,500 bonds for improvement to Center and No. Division Sts.

Utica, N. Y.—Council adopted ordinance for new sidewalks in Storrs Ave., Boyce Ave. and Culver Ave.; a water main in Mortimer St. from St. Vincent St. to a point 120 ft. easterly; repairs to crosswalks at South St. and Jefferson Ave.

Lillington, N. C.—County voted \$15,000 bonds to build roads, Lillington Twp.

Marshall, N. C.—Board of Aldermen passed ordinance for issuing \$15,000 street improvement bonds.

Morganton, N. C.—Co. Comrs. plan to issue \$105,000 bonds to build roads. J. R. Howard, Clerk.

Raleigh, N. C.—Wake County Commissioners appropriated \$1,500 as a deposit to secure \$15,000 federal aid to the Morrisville and Garner sections of the National Highway.

Salisbury, N. C.—Messrs. Harris, Forbes & Co. of New York purchased the paving bonds of \$75,000. Walter H. Woodson, Mayor.

Minot, N. D.—See "Water Supply."

Sydney, N. S.—Acting City Engineer R.

McKinnon will report on proposed improvements to Victoria road.

Canton, O.—Finance Committee approved plan to build roadway along the west side of the east creek between Tuscarawas St. east and 6th St. north-east.

Cincinnati, O.—Council passed resolution to pave and improve Quebec and Madison roads, Vineyard, Dunholter, Rockford and Gage Sts. F. Krug, City Engr.

Cleveland, O.—There were no bids received for the \$35,231 Cuyahoga County road bonds.

Circleville, O.—The \$18,000 road improvement bonds have been withdrawn. Fred R. Nicholas, Pickaway Co. Aud.

New Boston, O.—The street improvement bonds to the amount of \$41,500 were purchased by the Central Natl. Bank of Columbus. Thos. D. O'Neal, Village Clerk.

Lebanon, O.—Messrs. Durfee, Niles & Co., Toledo, purchased the \$12,000 street improvement bonds. M. E. Gustin, Village Clerk.

Newburgh Heights, O.—The Columbia Savings & Loan Co., of Cleveland, purchased the \$40,000 street improvement bonds. J. A. Fitzgerald, Village Clerk.

Port Clinton, O.—The German-American Bank, of Port Clinton, purchased the following bonds: (A) Inter County Highway No. 440, \$15,750; (B) Second St. improvement, \$4,000. Wm. H. Williamson, Village Clerk.

St. Clairsville, O.—Belmont County Auditor Bert W. Hopkins receiving bids July 2 for Intercounty Highway No. 101 bonds to the amount of \$56,697.

Toledo, O.—The city council will consider a resolution which would authorize the welfare director to contract for boulevard land. For the widening the city boulevard at the approach north of Dorr St., and the settlement of \$6,500 in claims arising from the establishment of the boulevard.

Toledo, O.—County Commissioners have authorized the advertising for bids for the improvement of eight roads—Peach Ave., Bancroft road, Glanzman road, Michigan Ave., Craig Ave., Bay Ave., Bay Ave. extension and Bay Shore road. Cost \$1,200.

Tishomingo, Okla.—Board of Commissioners of Johnston County adopted resolution providing for the issuance of the following road bonds: Garrett Township, \$28,500; Hains Township, \$14,000.

Okmulgee, Okla.—Okmulgee County Commissioners passed a resolution for the issuance of \$800,000 road improvement bonds.

Sayre, Okla.—Beckham County voted in favor of issuing road District No. 3 bonds to amount of \$15,000.

Portland, Ore.—Oregon voted to issue \$6,000,000 good road bonds.

Carbondale, Pa.—City Clerk H. G. Liley receiving bids June 25 for \$55,000 street improvement coupon bonds.

Erie, Pa.—Petition of property owners for the paving of Cherry St. from 26th St. to the city limits was granted.

Erie, Pa.—Director Kinney introduced bills for paving 24th St., French to Parade; and for the opening of Commerce St. from 12th to 13th between State and French Sts.

Aberdeen, S. D.—City Commissioners granted petition for a sidewalk on Second Ave. northeast from Dakota St. to Pennsylvania St.

Fayetteville, Tenn.—Bids until June 26, \$30,000 5 per cent, 20-10-year municipal paving bonds and \$12,000 county coupon 6 per cent serial notes; certified checks, \$1,000 and \$500. Hiram Higgins, City Clerk; H. L. Moore, County Court Clerk.

Knoxville, Tenn.—City Comrs. authorized \$800,000 bond issue to improve streets. J. B. McCalla, City Engr.

Dallas, Tex.—Commissioners Court of Dallas County adopted recommendations of J. F. Witt, County Engr., for expenditure of \$500,000 for construction of concrete roads, specifications for proposed work are being prepared, and bids will be received latter part of July. Work as outlined by engineer as follows: Dallas-Fort Worth road, aside from making all bridges permanent, provision is made for portland cement concrete pavement from end of new embankment of Commerce St. viaduct to foot of Obenchain Hill in West Dallas, 1½ mile; same kind of pavement for section of road through Mountain Creek bottom, 1.45 mile, cost \$73,424. Dallas-Coppell road, permanent bridges to replace all timber bridges, portland cement concrete pavement, 13

ft. wide from intersection with West Dallas pike to foot of Hasty Hill, 2 miles from point where Eagle Ford road intersects this road across bottom lands of West Fork of Trinity River to foot of Britain Hill, raising road above high water with earth embankment, gravel surfacing and 1,000 lin. ft. concrete bridging covering 1.8 mile, cost \$106,653. Dallas-Denton road, replace all timber bridging either with steel or concrete, cost \$16,500. Preston road, repairs to bridging \$2,000. Richardson road, replacing timber culverts with concrete, \$4,900. Garland road, replacing timber bridges with either steel or concrete, portland cement concrete pavement 18 ft. wide through White Rock Creek bottom, 2,000 ft. portland cement concrete pavement 16 ft. wide through Rowlet Creek, bottom and raised earth embankment with gravel surfacing through Muddy Creek bottoms, cost \$53,258. East Pike, replacing timber bridges and culverts with either steel or concrete, \$26,700. Dallas-Seagoville road, replacing all timber bridges and culverts with either steel or concrete, road which passes through White Rock Creek bottom to be raised above mean high water with earth embankment and 100 lin. ft. of steel and concrete bridging, using gravel as surfacing material, cost \$84,900. Miller's Ferry road, replacing all timber bridges with either steel or concrete, including 700 lin. ft. of concrete bridging through Five Mile Creek bottom, cost \$44,500. Lancaster road, replacing all timber bridges and culverts with either steel or concrete, cost \$16,500. Beckley road, replace all timber bridges and culverts with either steel or concrete, \$31,200. Cedar Hill road, replace all timber bridges and culverts with either steel or concrete, \$25,400.

Gorman, Tex.—Citizens voted in favor of issuing \$10,000 paving bonds.

Huntsville, Tex.—Walker County voted in favor of issuing \$150,000 road district No. 1 bonds.

Ogden, Utah.—Weber County Comrs. will ask the state comn. to approve the plans for building of a state highway from West Ogden through the Kanaville district to Hooper.

Ogden, Utah.—City will call for bids immediately for paving of Moffatt Ave., between 22nd and 23rd Sts., and both 23rd and 22nd Sts., between Washington and Adams Aves. City Engr. Tracy.

Provo, Utah.—County Commissioners referred the petition of Payson citizens for assistance in repairing a road in Payson Canyon to Commissioner Joseph Reece and County Surveyor Ben E. Argyle, with power to act.

Newport News, Va.—There were no bids received for the following bonds: Street improvement, \$50,000; Small Boat Harbor, \$50,000. Floyd A. Hudgins, City Clerk.

Seattle, Wash.—Bd. of Public Works approved plans for paving and sewers on 43d Ave. N. E.

Seattle, Wash.—City Engr. submitted plans for 15th Ave. N. W. Bridge approaches by paving, asphaltic concrete.

Seattle, Wash.—City Engr. submitted plans paving Howard Ave. and others; estimated cost, \$28,000.

Spokane, Wash.—F. W. Kellam, city clerk, reports the council has passed a resolution providing for the improvement of Sharp Ave. from Walnut to Maple St. by curbs, walks, etc. Morton Macartney, city engineer.

Spokane, Wash.—Council authorized Commissioner Funk to prepare estimates and a recommendation for its consideration to open up North Post St.

Cheyenne, Wyo.—The first mile of cement highway in this state will be built by the oil refineries at Casper, near the middle of the state. Wyoming road enthusiasts are trying to arouse interest in the construction eventually of the whole Wyoming section of the Lincoln highway with cement.

Amherstburg, Ont.—Tenders will be called shortly for construction of reinforced concrete pavements and curbs on Apsley and Sandwich Sts. for the town council. Engineer, Mr. Newman, Fleming Block, Windsor.

Aylmer, Ont.—Town Council plans cement sidewalks on Warren St. D. A. Davis, Clerk.

Brantford, Ont.—City considering constructing a cement sidewalk on south-west side of Wilkes St. F. Harry Jones, City Engineer.

Mitchell, Ont.—Town Council plans cement walks on Rowland St. Clerk, Wm. Ryan.

New Hamburg, Ont.—Town Council

plans concrete pavement, costing \$16,000. Clerk, H. C. Edgar.

Niagara Falls, Ont.—Council instructed City Engr. Jepson to submit a report on the best methods of building a walk in Victoria Ave. between Morrison and Huron Sts.

Strathroy, Ont.—Town council plan road improvements; plan to purchase two cars of gravel and want prices on crushed stone. Clerk, F. W. Atkinson.

Toronto, Ont.—City Council intends to construct an asphalt pavement on Hastings St. at a cost of \$2,266. City Clerk, W. A. Littlejohn.

York Township, Ont.—A number of requests for the grading of roads and applications for sidewalks will be considered by the council. Work on the laying of the water mains in the southern part of the township is now well advanced.

Bromptonville, Que.—Town Council will construct gravel road costing \$3,000. Engineer, M. W. Veuilleux.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Fresno, Cal.—Board of City Trustees awarded to the *California Road & Street Improvement Co. for the paving and grading of H St. and Park Blvd. Paving at 12½ cts.

Fresno, Cal.—Board of Trustees has awarded to *Kaufeld & Tompkins for the grading and oiling of Grant Ave.

More Opportunities Despite the War

In April and May, 1916, Municipal Journal published 3,997 items of contract news concerning Road, Street, Sewer and Water Supply construction.

In the same months of 1917 it published 4,174 items in the same fields.

Roads and Streets:

2,505 in 1916
2,528 in 1917

Sewerage:

835 in 1916
999 in 1917

Water Supply:

637 in 1916
647 in 1917

In spite of the war, Municipal Journal is giving more and better service to its readers—and contractors have more opportunities ahead of them.

Sacramento, Cal.—Board of Supervisors received the following bids for the construction of the Marysville road. M. N. Blumenkamp, of Stockton, \$33,343. The Contra Costa Construction Co., \$30,013. D. C. Howard, of San Francisco, .0175 per ft. for surfacing the Riverside road. E. M. Chadbourne, of San Francisco, .03, and the Western Motor Drayage Co., of San Francisco, 9-10 cts. for the same work. No bids were received for the Grand Island road. The bids were referred to the Highway Commission.

San Diego, Cal.—Common Council awarded the improvement of Quince St. to *Fairchild, Gilmore-Wilton Co., at the prices named: Excavation, per cu. yd., 35 cts.; embankment, per cu. yd., 1 ct.; paving, per sq. ft., 13 8-10 cts.; cement curb, per lin. ft., 35 cts. Allen H. Wright, City Clerk.

Hamden, Conn.—*Standard Construction Co., 42 Church St., New Haven, concrete sidewalk and curb, about \$3,000. Whitneyville. Private plans. Thomas D. Roehford, Selectman, Hamden.

Plymouth Conn.—*Lane Construction Co., 35 Colony St., Meriden, Conn., for concrete paving on Main St.

Jacksonville, Ill.—*Standard Paving Co., 29 S. La Salle St., Chicago, paving; Mound Ave. E. M. Henderson, City Clk.

Springfield, Ill.—The following contracts were awarded by the State Highway Commission on May 31: Henry Co.—Sec. D, Route 6, oiled earth; *Cameron, Joyce & Co., Keokuk, Ia., \$23,215.28.

McDonough County—Sec. L, Route 4, earth; *Buis & Olson, St. Joseph, Mo., \$3,995.56. Jefferson County—Sec. C, Route 5, earth; *Collins & Irons, Mt. Vernon, Ill., \$8,259.13.

Bloomington, Ind.—Monroe County Commissioners let the following pike road contracts: *L. C. McDaniels, the work on the George Hanna pike in Richland township, for \$6,410; *C. E. Danner will build the J. R. McDaniel pike in Bloomington township, \$10,058; McCormick & Rogers were the lowest bidders on the George Adams road in Perry township, at \$6,419.

Brownstown, Ind.—*Smith & Bebout of Freetown, Ind., was the successful bidder for a Jackson county road, \$1,945.

Hartford City, Ind.—Contract for the construction of the Cherry St. road was awarded by the county commissioners to *Perry Clamme, \$35,000. For the Willman bridge, to *J. E. Clark \$91.

Indianapolis, Ind.—Indianapolis board of public works let the following contracts: Construction of a reinforced bridge, to *T. R. Mead & Co., at \$12,975. First alley east of Delaware, from 30th to 31st, reinforced concrete, at \$2.22 per ft. First alley east of Meridian from 32d to 33d, brick roadway, to *A. D. Bowen at \$2.93 per ft. Michigan St. from Emerson to 1,029 ft. east of Emerson, asphalt and curb, to *Union Asphalt Construction Co., at \$7.90 per ft.

Indianapolis, Ind.—Board of Public Works let the following contract: 10th St., from Dorman to Keystone, asphalt roadway, to Indiana Asphalt Paving Co., at \$2.49 per ft.

Logansport, Ind.—Contract for a Cass county gravel road was awarded to *Martin McHale, of Logansport, Ind., for \$7,190.

Rushville, Ind.—Contract for the T. L. Behr Rd., in Jackson Twp., was awarded by the comrs. to the *Ohio Constr. Co. for \$9,995; also obtained the contract for the Robert Holt Rd. in Center and Jackson Twp., for \$15,195.

South Bend, Ind.—*Reed & Sons, contractors, secured the contract to build the Brykit Rd. in Penn township from the county commissioners, \$3,220.

Baltimore, Md.—For 13,000 cu. yds. grading, awarded *Howard O. Firor, 1707 W. Pratt St., at \$2,600. J. H. Robinette, Chmn. Constn. for Opening Sts.

Baltimore, Md.—*Holt Constn. Co., Denton, Md., by State Road Comrs., Frank H. Zouck, Pres., 601 Garrett Bldg., Baltimore, for 1.18 mile concrete highway in Caroline County.

Hagerstown, Md.—The Williamsport Pike Co. placed an order for about 20,000 gals. of Tarvia "B" with the *Barrett Co., of Philadelphia. The company will rebuild the entire pike from the city limits to Williamsport.

Jackson, Mich.—For asphalt paving, *Brooks Constn. Co., 2401 Miner St., Fort Wayne, Ind., brick paving, *Wm. Ryan, Lansing, Mich., about \$277,297.52, paving, C. H. Vedder, City Clk.

Brainerd, Minn.—City Council awarded *A. E. Dahl & Co. paving 17 blocks.

Duluth, Minn.—D. H. Clough & Co. submitted the lowest bid on the grading of the Farrell road for the proposed Kenwood street car extension. The specifications call for the paving of 11th St from Seventh to Eighth Ave. east, and the grading of the Farrell road extension from that point to a short distance above the boulevard. The low bid was \$5,491.

Duluth, Minn.—County Commissioners let to *Matt Harris, for extending the Young Lake road in the Sixth district one mile, \$2,160.75; for the construction of 2½ miles of the Algren road, Sixth district, \$6,160.80. *John Kotchever, for the extension of 1 mile of the Willow River road, Seventh district, \$1,765.60. *Axel Norling, for building 1 mile of the Stickney road, Fifth district, \$843.24. *S. Antilla and *J. Antilla, for constructing the Oja road, Seventh district, for a distance of 3 miles, \$4,320. *Einar Sepponen, for 1.66 mile of the Runquist road, Seventh district, \$1,810.25. *Nygaard & Saari, for building 2.52 miles of the Carlson road, Seventh district, \$4,024.93.

Duluth, Minn.—Commissioner Farrell accepted the bid of *Rogers & McLean at \$5,633.50, for the improvement of several streets in Morningside Park and will introduce in Council a resolution awarding the contract.

Hibbing, Minn.—*Dohm Constn. Co., Duluth, for laying sidewalks in Bennett Park. D. H. Haley, City Clerk.

Moorehead, Minn.—*C. T. Welsh Co., 2628 Humboldt Ave., St. Minneapolis, for

Sacramento, Cal.—Bids opened May 28 for constructing state highway in Santa Barbara County, Division V, Route 2, Section C. State furnished reinforcing steel, corrugated metal pipe, wire mesh reinforcement, Portland cement, sand and coarse aggregate; \$70,416.80.

Items	Quantities	Estimate	W. A. Dantanville, Salinas, Cal.	Conner Contracting Co., Los Angeles	Robert Sherer, Los Angeles	Conners, Green & Co., Eureka	Leigh G. Gurnsey, Los Angeles	Sandrock Transfer Co., San Luis Obispo
Excavation (without classification).....	60,000 cu. yds.	\$0.40	\$24,000.00	\$0.39	\$23,400.00	\$0.50	\$30,000.00	\$0.45
Corrugated metal pipe, 12-inch.....	1,125 lin. ft.	.45	506.25	.40	450.00	.50	562.50	.45
Corrugated metal pipe, 18-inch.....	280 lin. ft.	.55	154.00	.60	168.00	.75	210.00	.55
Corrugated metal pipe, 24-inch.....	60 lin. ft.	.60	36.00	.70	42.00	.85	51.00	.70
Corrugated metal pipe, 30-inch.....	380 lin. ft.	.70	266.00	.80	304.00	1.00	380.00	.85
Cement concrete, Class "A" (culverts and manholes).....	480 cu. yds.	9.00	4,320.00	9.00	4,320.00	10.00	4,800.00	11.00
Cement concrete, Class "A" (pavement).....	8,540 cu. yds.	3.25	27,755.00	3.45	29,463.00	2.95	24,339.00	4.20
Wire mesh reinforcement (hauling and placing).....	60,000 100 sq. ft.	.10	6,000.00	.25	150.00	.10	60.00	.20
Guard rail.....	10,000 lin. ft.	.40	4,000.00	.45	4,500.00	.40	4,000.00	.37 1/2
Monuments, hauling and setting.....	162 each	.50	81.00	1.00	162.00	1.00	162.00	1.00
Net total.....			61,303.25		62,084.00		64,683.50	
Contingencies 15%.....			9,195.43					
Totals.....			\$70,498.74		\$63,084.00		\$74,677.20	\$73,390.75

Estimate \$70,498.74

paving Eighth St. from First to Eighth Aves., and Seventh Ave., between Eighth and 11th Aves., \$38,625. S. Birch & Sons bid on both \$48,535. R. G. Price, City Clerk.

Maysville, Mo.—*C. T. Petry, Marshall, Mo., paving. A. D. Hewitt, City Clerk, Maysville.

Omaha, Neb.—*Russell P. Condon, 3634 S. 26th St., grading. Frank Dewey, Clk., Douglas County.

Bayonne, N. J.—*W. T. Crichfield, 54 5th St., Hoboken, by city, paving 12 streets, asphalt and macadam, \$150,000.

Perth Amboy, N. J.—A contract for paving section of Florida Grove road lying between New Brunswick Ave. and Kinsey's corner will probably be awarded to Little & Pfeiffer, of this city, at a joint meeting of the Board of Aldermen and the Woodbridge Township Committee at \$20,707.60.

Rutherford, N. J.—*G. B. Belcher, 257 Passaic St., Hackensack, by board of freeholders, paving portion Rutherford Ave.

Westville, N. J.—*C. W. Matthis & Co., Seaside Park, N. J., curb and walk, about 5,280 ft. concrete curb and 21,000 sq. yds. concrete pavement, at \$20,000. B. Atkinson, Boro. Clk., Westville, N. J.

Amsterdam, N. Y.—City awarded *Carbonelli & Persico the contract to grade Church St. from Kellogg to Clizbe Ave.; \$3,510.

New Rochelle, N. Y.—Comnr. of Public Works John A. Hadert awarded the contract for laying macadam on Meadow Lane from Liberty Ave. to Elm St. The *Pioneer Contracting Co., \$1,048.

Niagara Falls, N. Y.—City Council postpones action on the bids received for the paving of Main St. from the south line of Ontario Ave. to the west line of Fourth St. All bids were under the engineer's estimate except the bid for asphalt block; as follows: Sterling brick—Public Service Contracting Co., \$111,518.50; Read-Coddington Engineering Co., \$115,014.50. Metropolitan brick—Public Service Contracting Co., \$113,702.50; Read-Coddington Engineering Co., \$117,198.50; H. P. Burgard Co., \$121,802. Conneaut brick—Public Service Contracting Co., \$110,582.50. Sheet asphalt—Read-Coddington Engineering Co., \$108,172.50; H. P. Burgard Co., \$113,882. Asphalt block—Read-Coddington Engineering Co., \$121,276.50. Wood block—Public Service Contracting Co., \$130,042.50; Read-Coddington Engineering Co., \$129,225.50; Read-Coddington Engineering Co., \$127,632.50; Henry P. Burgard Co., \$133,594. Bitulithic—Warren Bros. Co., \$98,145.

Niagara Falls, N. Y.—City Council let contract for paving of 20th St. from Niagara St. to Pine St. to the *Public Service Contracting Co. on its bid of \$32,080.50 for Conneaut block.

Grand Forks, N. D.—City Council opened bids for the curbing and grading of 3rd St. from the Great Northern to the Northern Pacific right of way. P. J. McCoy was low bidder for the grading of the street, making an offer of 98 cts. per cu. yd. G. H. Roberts offered a bid of \$1.10 per cu. yd. B. O. Norlin submitted the only bid for curbing, for a straight curb was 45 cts. per running ft. For a circular curb, 50 cts. per running ft. His offer for catch basins was placed at \$55 each. For 8-in. pipe from the catch basin to the sewer at 90 cts. per running ft. For 8-in. pipe from the curb to the catch basin at 50 cts. per running ft. C. I. openings from the curb into the gutter, to furnish and place at price of \$3.50 each. All bids were taken under advisement.

Hettinger, N. D.—*Edw. Texley, Stowers, N. D., and Albert Leff, Reeder, N. D., road work. H. J. Slicker, Aud. Adam County.

Cleveland, O.—*McHugh Bros., Springfield, O., at \$57,000, paving and sewer, Brook Park road No. 3. Engr., W. A. Stinchcomb, Court House.

Dayton, O.—*Bigler Bros., Middletown, at \$23,122, paving Central Ave., brick.

Lebanon, O.—For paving and constructing concrete curb and gutters awarded to *Henry Strodtbeck, Middletown, O., at \$23,561.

Springfield, O.—City Comm. awarded *F. Ryan for paving East North St. from Limestone to Spring with Trinidad asphalt, at \$5,283.

Marshfield, Ore.—*Moon & Gidley were awarded the contract for hard-surfacing Central from 4th to 14th St. on their bid of \$39,886.94. *C. R. Dean for the cement sidewalks, his bid for the 19,050 sq. yds. of walk totaling \$2,661.52.

Bethlehem, Pa.—Fountain Hill Borough Council let to *Daniel Delgrossi for the construction of reinforced cement gutter crossings at 40 cts. per sq. ft.

Canonsburg, Pa.—*Hardy & Rankin, paving, grading and curbing, \$60,000, Smithfield Ave. Engr., H. M. Day. W. C. Black, Boro. Clk.

Erie, Pa.—City awarded to *John J. Doyle to repave West 18th St. from Peach to Liberty Sts.

Pawtucket, R. I.—*H. F. Lull Estate, 205 Oak Hall Bldg., by Isaac Gill, Commissioner of Public Works, granolithic sidewalks.

Mitchell, S. D.—For paving 25 blocks, awarded to *C. H. Atkinson, Watertown, S. D., at \$57,460.

Franklin, Va.—*Central Constn Co., Harrisburg, Pa., paving and curbing. Engrs., Anderson & Christie, Charlotte, N. C., 3,500 sq. yds. cement pavement, 1 1/2 Road, Walkerville.

Moundsville, W. Va.—*R. J. McFadden, paving and curbing Purdy Ave., 13th to 14th. O. B. Boner, City Clerk.

Goldendale, Wash.—*W. Liedl, at approximately \$13,000, secured the contract for the construction of the Goldendale-Glenwood road. The award was on the unit basis.

Oakville, Wash.—Contract for an 18-ft. paving on the main street from the east to west limits, to *Grays Harbor Construction Co.

Everett, Wash.—Bids opened by the County Commrs. for the paving of Bonds Road Proposition No. 18 and 29 from Arlington north resulted as follows: Kaiser Paving Co., Everett, \$29,380; J. W. Hoover, Everett, \$29,504; Renseith Bros., Everett, \$30,000. All bids were taken under a week's advisement.

Menasha, Wis.—Council awarded *Joseph Schneider paving of Walnut St. with concrete.

Oconto, Wis.—Following bidders on paving: White Constr. Co., Milwaukee, c. and g., 60 cts. per ft.; excav., 59 cts. cu. yd.; sheet asphalt, type A, \$2.03; type B, \$1.96; manholes, \$28; catch basins, \$28; replacing cut asphalt paving, \$1.50 sq. yd. Bid of The Miner Co., Richland Center: Excavation, 60 cts. cu. yd.; curb and gutter, 60 cts. cu. yd.; reinforced concrete, \$1.59 sq. yd.; manholes, \$45; catch-basins, \$40, and catch inlets, \$25.

Windsor, Ont.—The following contracts awarded for the construction of reinforced concrete pavement and curbs by City Council: Victoria, Ellis, Brauce and Church, \$44,329. *C. W. Cadwell Sand & Gravel Co., 84 Sandwich St.; Montmorenci, Marentette and Elsmere, \$16,900. *Merlo, Merlo & Ray, 116 Windermere Road, Walkerville.

Notre Dame de Lourdes, Que.—For concrete sidewalks costing \$3,365 by the Municipal Council awarded *The Quebec Concrete & Contracting Co., 14 St. Roch St. Quebec.

SEWERAGE.

Stuttgart, Ark.—Plans are being made for installing sewerage system in District No. 4. Cost, \$28,000.

Tempe, Ariz.—The Board of Supervisors have authorized an election to be held on June 25 for the purpose of voting for a drainage district to be known as District No. 2, south of Tempe.

Fresno, Cal.—Board of Trustees granted permission to lay an 8-in. sewer in Alta Vista tract.

Los Angeles, Cal.—Report of the City Engr. with reference to sewage treatment plant to be located in the San Fernando Valley received and filed.

Fort Collins, Colo.—City considering plans for two trunk line sewers.

Perry, Fla.—See "Water Supply."

Arthur, Ia.—City Council voted to build sanitary sewer system; about 9,000 ft. sewer pipe and septic tank to be installed.

Manhattan, Kan.—City plans to install storm sewers in Bertrand St.

Alma, Mich.—City will spend \$403,000 for sewer and water extensions and street and sidewalk improvements.

Pontiac, Mich.—Plans, profiles and estimates were presented by the City Engineer for sanitary sewers in several streets. Voorheis Rd. was estimated to cost \$3,698.63; in Auburn Ave. from Shirley to city limits, \$6,735.75; in Pad-dock from Clinton River to Oak Hill St., \$3,549.21, and in Shirley from Au-

burn to Judson, \$657.25. Objections to the construction will be heard on June 25.

Minneapolis, Minn.—Carl Ilstrup, city sewer engineer, announced construction work on trunk line sewers authorized built in the city will be delayed until after the sale of bonds for the work, July 15.

Spring Valley, Minn.—Bids will probably be asked shortly for constructing sewer system to cost about \$50,000. Plans have been prepared. E. H. Adams, Village Clerk.

Cape Girardeau, Mo.—Plans for installing West End sewer, cost about \$310,000. A. Stiver, city engineer.

LeRoy, N. Y.—The city is planning the construction of new sewerage system involving 8 to 24-in. vitrified pipe, Imhoff and sprinkling filters to cost about \$200,000. James P. Wells, consulting engineer, Rochester, N. Y.

Solvay, N. Y.—The Solvay Bank purchased the \$19,000 sewer bonds.

Utica, N. Y.—Council adopted ordinance for a sewer in Pleasant St. from Kemble St. to Oneida St.

Yonkers, N. Y.—Board of Contract awarded to Frank J. Kelly for \$5,954 for the construction of a house sewer

in Sedgwick Ave., a sewer easement, and Tibbets Rd. from a point in Sedgwick Ave. 375 ft. south of McLean Ave., southerly, westerly and northerly to the Bronx Valley Sewer easement.

Newark, O.—City plans to install sewers in portions Buena Vista and Florence Sts. E. H. Wells, City Engr.

Sidney, O.—No bids received for the \$20,700 sewer bonds. Melvin L. Rhoades, City Aud.

Toledo, O.—City Council will probably late in June consider the proposed elimination of Ten Mile Creek sewage. City Engineer McClure announced experimental plans for new sewage for Swan Creek, the East Side and the rest of the west side also will be submitted for the Council's approval.

Urbana, O.—City contemplates storm sewer in portion West Water St. E. F. Sweetman, City Engr.

Ada, Okla.—Taxpayers voted in favor of issuing \$25,000 sewage disposal bonds.

Kittanning, Pa.—City authorized street commr. to lay 200 ft. of 8-in. sanitary tile sewer in Johnson Ave.

Hobridge, S. D.—City engineer ordered to prepare plans for sewer extensions. Bids to be asked soon.

Sioux Falls, S. D.—Plans to install lat-

eral sewers in portions Nesmith 6th, 19th and 3d Sts. S. B. Howe, city engr.

Seattle, Wash.—See "Streets & Roads."

Hillsboro, Wis.—Mr. L. Clements of Hillsboro purchased the \$7,000 sewer bonds.

Blenheim Twp., Ont.—Township Council plans drainage work. Clerk, Hugh Allan, Drumbo.

London, Ont.—City Council intends to construct tile sewers on Simcoe and Emery Sts. at an estimated cost of \$1,002.57 and \$2,279.30 respectively. City Engineer, H. A. Brazier.

Niagara Falls, Ont.—City Engr. Jepson submitted \$259.25 as an estimated cost of constructing the River Alley sewer.

Sarnia, Ont.—City Council passed a by-law for the construction of sewers on Lochiel and Russell Sts. City Engineer, John A. Baird.

Sarnia, Ont.—The Provincial Board of Health has approved of sewers on Clifford, Shamrock, Rose, Christina and Chippewa Sts.

Tilbury North Twp., Ont.—Township Council plans tile drainage work to cost \$100,000. Clerk, H. J. Rocheleau, Stony Point.

Toronto, Ont.—City Council intends to

Sacramento, Cal.—Bids opened by State Highway Comm., May 28, for state highway in Ventura Co., Div. VII, Route 2, Section C. Reinforcing steel, corr. metal pipe and pipe railing: \$16,893.10.

Conner Contg. Co.,
L. A.

Items	Quantities	Estimate	Bid	Amount	
Excavation (without classification).....	14,300 cu. yds.	\$0.40	\$5,720.00	\$0.50	\$7,150.00
Corrugated metal pipe, 18-inch.....	82 lin. ft.	1.50	41.00	1.00	82.00
Corrugated metal pipe, 30-inch.....	26 lin. ft.	1.00	26.00	1.00	26.00
Cement concrete, Class "A" (culverts and monuments)	115 cu. yds.	12.50	1,437.50	12.00	1,380.00
Cement concrete, Class "A" (pavement).....	4,080 cu. yds.	4.00	16,320.00	4.50	18,360.00
Guard rail	814 lin. ft.	.40	325.60	.50	407.00
Monuments (hauling and setting).....	56 each	.50	28.00	1.00	56.00
Net total			23,898.10		
Contingencies 15%			3,584.72		
Totals			\$27,482.82		\$27,461.00

Sacramento, Cal.—Bids opened by State Highway Commission for constructing state road in Yolo Co., Div. III, Route 6, Section A: Cement, sand, coarse aggregate, wire mesh reinforcement, corrugated metal pipe, felt, cast-iron gratings and steel ladder rings; \$5,660.89.

Items	Quantities	Engr.'s & Ambrose, Estimate	Teichert S'cmento	Mathews Construc- tion Co., S'cmento	Ross Construc- tion Co., S'cmento	Alfred H. Vogt, San Fran.	C. H. & A. W. Gorrill, San Fran.	C. E. Cotton, San Fran.	T. M. Olney, Oakland.
1. All work, Sta. 93+68.5 to Sta. 95+88.5, complete		\$8,209.20	\$14,078.00	\$14,814.00	\$12,611.00	\$17,867.00	\$10,750.00	\$12,378.00	\$10,600.00
2. All work, Sta. 89+99.4 to Sta. 93+68.5 and 95+88.5 to Sta. 102+14, complete.....		2,116.50	2,725.00	3,373.00	2,000.00	4,325.00	4,540.00	3,594.00	3,000.00
Alterations:									
3. Wooden piling under Item 1.....			1,675.00	2,200.00	1,600.00	1,500.00	1,250.00	1,100.00	750.00
Net total		\$10,325.70							
Contingencies 15%.....		1,548.86							
Totals		\$11,874.56	\$16,803.00	\$18,187.00	\$14,611.00	\$23,692.00	\$15,290.00	\$15,972.00	\$13,600.00

Sacramento, Cal.—Bids opened by State Highway Dept., May 28, for constructing state highway in Tulare Co., Div. VI, Route 4, Section C. Reinforcing steel, corr. metal pipe, cement, sand, coarse aggregate and pipe railing: \$53,627.75.

J. H. Shafer, Los Angeles, Cal. Leigh G. Garnsey, Rogers Bros. Co., Los Angeles, Cal.

Items	Quantities	Estimate	Bid	Amount	Bid	Amount	Bid	Amount	
Excavation, ordinary (without classification)	14,000 cu. yds.	\$0.50	\$7,000.00	\$0.55	\$7,700.00	\$0.60	\$8,400.00	\$0.70	\$9,800.00
Excavation (borrow)	4,000 cu. yds.	.65	2,600.00	.55	2,200.00	.78	3,120.00	.70	2,800.00
Corrugated metal pipe, 12-inch.....	330 lin. ft.	.50	165.00	.50	165.00	1.50	495.00	1.00	330.00
Corrugated metal pipe, 18-inch.....	30 lin. ft.	.60	18.00	.75	22.50	1.75	52.50	1.00	30.00
Corrugated metal pipe, 24-inch.....	185 lin. ft.	.80	148.00	1.00	185.00	2.25	416.25	1.00	185.00
Cement concrete, Class "A" (culverts and monuments)	410 cu. yds.	10.00	4,100.00	11.00	4,510.00	16.00	6,560.00	12.00	4,920.00
Cement concrete, Class "A" (pavement)	9,000 cu. yds.	3.00	27,000.00	3.44	30,960.00	4.89	44,010.00	4.66	41,940.00
Guard rail	700 lin. ft.	.50	350.00	.70	490.00	.40	280.00	.70	490.00
Monuments, hauling and setting.....	44 each	.50	22.00	.75	33.00	.75	33.00	2.00	88.00
Net total			41,403.00						
Contingencies 15%			6,210.45						
Totals			\$47,613.45		\$46,265.50		\$63,366.75		\$60,583.00

Sacramento, Cal.—Bids opened by State Highway Dept., May 28, for state highway in Solano Co., Division III, Route 7, Section E. Reinforcing steel, wire mesh reinforcement, corr. metal pipe, cement, sand and coarse aggregate: \$35,056.70.

M. Blumenkronz, Stockton C. H. & A. W. Gorrill, S. F. T. M. Olney, Oakland

Items	Quantities	Estimate	Bid	Amount	Bid	Amount	Bid	Amount	
Excavation (without classification)....	21,100 cu. yds.	\$0.70	\$14,770.00	\$0.75	\$15,825.00	\$0.45	\$9,495.00	\$0.80	\$16,880.00
Corrugated metal pipe, 12-in.....	160 lin. ft.	.40	64.00	.75	120.00	.50	80.00	.50	80.00
Corrugated metal pipe, 18-in.....	300 lin. ft.	.50	150.00	1.00	300.00	.60	180.00	.60	180.00
Corrugated metal pipe, 24-in.....	60 lin. ft.	.60	36.00	1.25	75.00	.70	42.00	.70	42.00
Cement concrete, Class "A" (culverts and monuments)	200 cu. yds.	10.00	2,000.00	15.00	3,000.00	10.00	2,000.00	12.00	2,400.00
Cement concrete, Class "A" (pavement)	8,200 cu. yds.	3.25	26,650.00	4.40	36,080.00	4.85	39,770.00	3.50	28,700.00
Wire mesh reinforcement (hauling and placing)	40,000 100 sq. ft.	.10	40.00	1.50	600.00	.25	100.00	.25	100.00
Guard rail	450 lin. ft.	.30	135.00	.75	337.50	.40	180.00	.35	157.50
Monuments, hauling and setting.....	52 each	.50	26.00	1.50	78.00	1.50	78.00	1.00	52.00
Net total			43,871.00						
Contingencies, 15%			6,580.65						
Totals			\$50,451.65		\$56,415.50		\$51,925.00		\$48,591.50

construct a sewer on Don Esplanade, west side, from Eastern Ave. to Wilton Ave., at a cost of \$20,500. City Clerk, W. A. Littlejohn.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Fresno, Cal.—Board City Trustees awarded to *F. J. Hunt for \$350 for the sewer in Sohn's addition.

Los Angeles, Cal.—Board of Public Works, Horace E. Ferris, Secy., let to *B. Zaich, at \$1,874, vitrified pipe sanitary sewer in Kenmore Ave.

Los Angeles, Cal.—Board of Public Works let *John Sutalo, at \$14,393, vitrified pipe sanitary sewer, Larchmont Blvd.

Los Angeles, Cal.—Board of Public Works let storm drain 20 ins. in internal diameter composed of vitrified pipe. Valverde St., to *E. C. Peck, \$498.

Hartford, Conn.—*O'Neill Bros, 172 Farmington Ave., sewer, at \$6,605, by board of contract and supply. Jos. Butts, Secy.

West Burlington, Ia.—*Arthur A. Dobson Co., Lincoln, Neb., at \$38,450, water works improvement and sanitary storm sewer, \$70,000. W. J. Gieselmann, City Clerk.

Mt. Rainier, Md.—*Herman Stensrud, 311 S. Front St., Marquette, Mich., sewage system and disposal plant, \$50,000, 8 to 9 miles sewer. Peter J. Hogan, Town Clerk, Mt. Rainier.

New Bedford, Mass.—*American Sewer Pipe Co., 185 Devonshire St., Boston, 400 sewer ft., 36-in. Amco blocks, \$2.75 per sewer ft. Chas. F. Lawton, Supt. of Streets.

Holly, Mich.—Village Council awarded: *C. S. Bell and Sons, sewers on Sherman, Fulton, Broad and Michigan Sts.

Duluth, Minn.—Low bidders for sewer work, Riback & Parvi, sanitary sewer in Eighth St., from 40th to 41st Ave. west, \$433.34; Leonard Hedberg, sewer in 8th St., from 22d to 23d Ave. west, \$1,698, and John Hedberg, sewer in Winona St., \$997.

Virginia, Minn.—For tile storm sewers in Rooney's addition, *Chris Christopher-son, 512 Second St., at \$11,000.

Omaha, Neb.—For sewer construction *Nebraska Construction Co., 4529 Parker Ave. T. J. O'Connor, City Clk. John A. Bruce, City Engr., 401 City Hall.

Roselle Park, N. J.—*T. Foster Callahan, 564 Chester St., Elizabeth, N. J., lateral sewers, 260 ft. 10-in. and 500 ft. 8-in. sewer, 3 manholes and 37 4-in. house connections. Engr., J. Wallace Higgins, 52 Vanderbilt Ave., New York City.

Gloversville, N. Y.—Council awarded for the construction of a sanitary sewer in Orange St., *Clarence Welch & Co., involving an expenditure of \$598.70.

Olean, N. Y.—Council awarded *Furv & Foote at \$255 for construction of the Reed St. sewer.

Cleveland, O.—*Sprague & Burkhardt, 12003 Woodland Ave., sewer, Nelson Ave., at 93d St. Edw. Shattuck, Comr. Purchases & Supplies, 219 City Hall.

Dayton, O.—*R. J. Paul, W. Fifth, near Ludlow St., storm sewer E. Third St. Engineer, Fred Eichelberger, City Bldg. H. M. Walte, City Mgr.

Lorain, O.—*Tony Tripletto, Lorain, at \$5,271, sanitary sewer, alley between E. 31st to E. 32d Sts. A. J. Horn, Dir. of Public Service, L. B. Johnston, Clerk, City Hall.

New Matamoras, O.—*Greene & Getman for sanitary sewers. W. P. Mason, City Engr., 406 German Bank Bldg., Marietta, O.

Zanesville, O.—*W. E. Getz, Baltic, O., open ditch, \$1,270, Muskingum township. W. H. Crabtree, Clk., Muskingum Township, Nashport, O.

Cordell, Okla.—*Municipal Excavator Co., Oklahoma City, at \$42,200, sewers. J. Reid, City Clerk.

Birdsboro, Pa.—*L. H. Facht & Son, Baer Bldg., Reading, Pa., by Birdsboro Steel Co., Robt. Brook, Pres., for sewage disposal plant, about 1 mile 8-in. T. C. pipe, sedimentation beds, etc. Hill & Ferguson, Engr., 100 William St., New York City.

Plymouth, Pa.—*Wm. Parrish, sewer. Geo. J. Curran, Boro. Secy., 17 N. Main St., T. C. pipe.

Seranton, Pa.—*Mathias Stipp, 435 Moir Court, at \$86,000, for 26,960 lin. ft. t. c. pipe sanitary sewer. Wm. A. Schunk, City Engr.

Franklin, Va.—*Central Construction Co., Harrisburg, Pa., 3,000 ft. sanitary

sewers. L. A. Gay, Village Rec., Franklin.

Osceola, Wis.—See "Water Supply"

Racine, Wis.—F. Fair, sewer and water connections in Wilson, Ann, Phillips, Holmer, 10th and 12th Sts., in Carlisle Ave., to *Fall Bros.

Superior, Wis.—Board of public works received bids for the construction of sewers in Stinson Ave. at the East End. The awarding of the contract was deferred until a later date. Following were the bids: Magnus Peterson, \$2,927.72; Johnson Anderson, \$2,945.40, and M. Jacobson, \$3,475.

Colchester South Twp., Ont.—Township Council awarded drainage work to *Albert Gerard, care of Township Clerk, J. H. Madril, Harrow.

Dereham Twp., Ont.—*C. Marone, care of Township Clerk, Alex. Bell, Dereham Centre, has been awarded contract for drainage work for the Township Council.

Windsor, Ont.—City Council let contract to *Adams & Olandi, Dougal Ave., for construction of sewer costing \$9,953.

WATER SUPPLY.

Talladega, Ala.—City plans to install new water supply system; daily capacity 1,000,000 gals. Cost, \$145,000. City Clerk, A. G. Weldon.

Lineville, Ala.—J. B. McCravy Co., Atlanta, preparing plans for a water wks. system here; cost, \$25,000.

Edmonton, Alta.—City Council plans water extension costing \$47,272. A. W. Haddrow, Actg. City Engr.

San Diego, Cal.—City retained H. N. Savage as hydraulic engineer to construct the Lower Otay dam.

Santa Paula, Cal.—The State R. R. Comn. authorized the Santa Paula Waterworks to issue \$8,000 in notes to lay additional mains.

Sterling, Colo.—Site has been selected by city for proposed water pumping plant. G. C. Fargale, supt.

Washington, D. C.—Bureau of Foreign and Domestic Commerce (Dept. of Commerce).—The director of economic affairs of a foreign government is in the market for waterworks, drains, electrical apparatus and supplies. A more complete list of the goods desired and full information in regard to terms, etc., may be obtained from the bureau or its district offices. Refer to Opportunity No. 24646.

Perry, Fla.—Taxpayers voted in favor of issuing \$20,000 water and sewer bonds.

Canton, Ill.—Water Superintendent E. H. Aout, in his annual report, recommends a large meter at the pumping station, that the old pumps be connected, so they could be used in case of a break.

Pearl, Ill.—State Public Utilities Commission authorized the Thurmon Spring Water Co. to establish a public water system in this village.

Arlington, Ia.—Taxpayers voted in favor of issuing \$18,000 bond for the installation of a water works system.

Knoxville, Ia.—City considering construction of water works system; \$20,000. C. W. Rowland, Des Moines, Engr.

Lake City, Ia.—City considering installing deep well pump and fire pressure pump.

Riceville, Ia.—City has sold a bond issue of \$60,000 for waterworks improvements.

Stuart, Ia.—Plans for construction of reservoir and laying of additional mains.

Hays, Kan.—Plans are being made by E. T. Archer & Co., Kansas City, Mo., for municipal waterworks and electrical improvements to cost \$25,000.

Kanopolis, Kan.—Plans are being made for a special election to vote bonds for extensions to the electric lighting and waterworks systems.

Parsons, Kan.—Plans are being prepared for the installation of waterworks system to cost about \$600,000. F. E. Workman, Supt.

Tipton, Kan.—City voted \$20,000 bonds for water works. G. P. Taylor, Stockton, engr.

Shrewsbury, Mass.—Town voted to borrow \$11,000 to extend the water wks. system.

Holly, Mich.—Village Council voted to extend the water mains from Maple St. north on Park Ave. to Elm St. and then west on Elm St. to Clarence St.

Slayton, Minn.—Village authorized a \$3,000 bond issue for improvements to

the water workst system. Bert Tietema, Village Clerk.

Asbury Park, N. J.—Plans to install a 6,000,000-gal. pumping engine.

Olean, N. Y.—Mayor Studholme referred to the Council's water committee without discussion the petition of the board of water commissioners presented to the City Council, asking that the city be bonded in the sum of \$75,000 for the purpose of building a filtration plant. Proposed plans provides for 1,000,000 gallons of water daily.

Utica, N. Y.—See "Streets and Roads." Minot, N. D.—City will vote June 25 for bond issue of \$185,000 for reservoir, city hall and street improvement.

Akron, O.—City voted \$1,000,000 bond issue for the extension and improvement to the water works system.

Canton, O.—Council granted authority to City Auditor Barr to sell the \$71,000 waterworks bond issue on which no bids were received to the city sinking fund board at par and accrued interest.

Chardon, O.—Village Clerk Robert S. Park receiving bids July 3 for \$58,000 water works system bonds.

Ada, Okla.—Taxpayers voted in favor of issuing \$75,000 water works bonds.

Altus, Okla.—Council plans to build additional reservoir for water supply.

Ramona, Okla.—Board of public works approved \$40,000 bonds to extend water system. U. G. Besett, pres.

Bonesteel, S. D.—Bruce & Standeven, Omaha, Neb., Engr., preparing plans for the installation of water works and light system.

Columbia, S. C.—City Council adopted resolutions agreeing to pay one-half the cost of constructing the pipe line to the cantonment site near Columbia for delivering city water there and to furnish water for the government at cost of 7 cts. per 1,000 gallons. The pipe line will be about 5 miles long and is to cost over \$100,000. The size of the pipe to be used will either be 14 or 16 ins, probably 16 ins. Paul Norcross, of the engineering firm of Solomon & Norcross, Atlanta, representing the government, and who has made extensive surveys of the line, suggests that a 16-in. pipe be laid to care for the consumption that will later take place along the line due to building. Contracts will be executed immediately by City Assistant Engineer Lee begins surveying for the proposed work. A supply of 2,000,000 gallons daily will probably be used.

Milbank, S. D.—The water bonds of \$12,000 were purchased by the Wells-Dickey Co., of Minneapolis. A. A. Blauquist, City Aud.

Ablene, Tex.—City considering installation of new water works pumping plant and improvement to water supply. Cost, about \$500,000. W. A. Riney, city engr.

Fort Worth, Tex.—Announcement was made by Comr. Lord that in the next three months the waterworks department will spend \$85,000 constructing sediment tanks, an aeration plant and in increasing the capacity of the filtration system to 15,000,000 gals.

Whitney, Tex.—Messrs. J. E. Jarratt & Co. of San Antonio purchased the \$15,000 water works bonds.

Ogden, Utah.—Property owners on 32nd St. petitioned the commission for an extension of a water main for a distance of about one block.

Paden City, W. Va.—An election will be held June 15 to vote a \$40,000 bond issue for improvements to water works system. H. L. Maddock, 404 Newark Trust Bldg., Newark, O., Engr.

Seattle, Wash.—Board of Public Wks. approved plans water mains in Shilshole Ave. and others.

Seattle, Wash.—City engineer submitted plans for reapproval water mains in 10th Ave. N. E. and others.

Valley, Wash.—The Magnesite Co. is planning to build water works system here.

Oshawa, Ont.—Plans are being prepared for filtration system; cost, \$40,000. W. G. Worgen, Engr.

Kaslo, B. C.—A \$15,000 gravity water system is to be installed at Balfour Sanatorium by the Dominion Government.

St. John, N. B.—City Council decided to have a number of water mains renewed. Acting city engineer, Frank A. McInnes.

St. Genevieve de Batiscan, Que.—City Council plans pumping plant to cost from \$8,000 to \$9,000. Prices wanted on pumping equipment. Clerk, Tenerede Trudel.

BIDS RECEIVED AND CONTRACTS
AWARDED.

(*Indicates Contracts Awarded.)

San Dimas, Cal.—*Klusinan & Elsay, Cucamonga, by San Dimas Water Co., installing 7,000,000-gal. reinforced concrete reservoir.

Casey, Ill.—*T. A. Hardman, Olney, by city, water mains, at \$14,300.

Chicago, Ill.—Board of Local Improvements, Michael F. Faherty, President; Edward J. Glaekin, Secretary, awarded contracts June 5th for water supply pipes as follows: *Simon Ryan, Malachy Murphy, *Tritilli & Till, Water service pipes to *David Walsh and *J. F. Wiest.

West Burlington, Ia.—See "Water Supply."

McPherson, Kans.—*Merkle-Hines Machine Co., 508 Interstate Building, Kansas City, Mo., awarded contract for improvements to water works and electric light plant to cost about \$20,000.

Wabasha, Minn.—*E. T. Webster, St. Paul, at \$6,390.35, for laying of 3,300 ft. 6-in. Class B cast-iron main.

Amsterdam, N. Y.—City awarded *Baptista & Romano the contract for constructing a water main on Stewart St.: \$382.

Niagara Falls, N. Y.—City Council let contract for supplying the city with 500 lengths of 6-in. c. i. pipe with valves and specials, to *Jas. B. Clew and Son of Chicago, at \$55.45 a ton and .04½ cts. a pound for fittings.

Canton, O.—Board of Control awarded the *Hill Pump Co. of Anderson, Ind., for two lift centrifugal pumps to be installed at wells in the southwest end of the city; prices for pumps and motors is \$5,320.

Oklahoma City, Okla.—*Holmboe Construction Co., Majestic Bldg., water works improvements. C. F. Semmelbeck, city clerk.

Oscoda, Wis.—*Wm. C. Fraser *07 Germania Building, St. Paul, awarded contract for waterworks and sewerage system at \$30,150. *Johnson & Drake, 705 Plymouth, Minneapolis, Minn., for reinforced concrete reservoir at \$4,426.

Racine, Wis.—See "Sewerage."

Belleville, Ont.—For three De Laval centrifugal pumps, all driven by Canadian Westinghouse Co. motors, awarded to the *Turbine Equipment Co., Ltd., Toronto. These pumps are each to de-

liver from 1 M.G. to 2 M.G. daily, against 250-ft. head.

Oshawa, Ont.—Contract has been awarded to the *Turbine Equipment Co. Ltd., Toronto, for a De Laval centrifugal pump, 1½ M.G. daily capacity against 340-ft. head.

MISCELLANEOUS.

Lassen, Cal.—Lassen County Board of Directors of the Baxter Creek Irrigation District have ordered the issuance of bonds in the sum of \$310,000, and to publish sale of the same on July 2, 1917. Chief Engineer H. S. Martin will shortly have contracts for construction of the dam and canals ready for publication for bids. H. S. Martin is chief engineer, Arad Way, assessor, and T. T. Gross, secretary of this pioneer district east of the Sierras.

Sacramento, Cal.—State Reclamation Board passed an order permitting the improvement for the enlargement of Knights Landing Ridge Drainage Dist. cut at an estimated cost of \$200,000, plans having been approved by the Federal engrs. and the State Engineering Department.

Moline, Ill.—Plans for a subway for pedestrians have been submitted to the City Council by engineers of the various roads operating through Moline. The subway is an experiment, and is to be built in accordance with a plan agreed upon by the railroad companies, the City Council and members of the Safety First Committee of the Moline Commercial Club. All expenses of construction are to be paid by the railroad companies. City Engr. Lyle Pavoon is preparing a sketch which will be turned over to the companies' engineers, showing location of gas mains, etc. which may have to be altered. The companies are ready to begin work as soon as the city designates a crossing.

Gary, Ind.—Bids received June 22, 1917, at 1 p.m., by City Controller, for sale, \$27,000 negotiable city bonds, 4½ per cent, 27 years. G. H. Manlove, City Controller.

Martinsville, Ind.—City Council will issue bonds to amount of \$15,000 at an early date to cover cost of erection of new city hall building.

Duluth, Minn.—Street car extensions will be built to New Duluth, Fond du Lac, Proctor, Calvary cemetery, Kerwood and Duluth Heights, Crosley Park, the Hermantown cemetery, with the probability of including the First St. downtown loop, if the city acquires the traction line plant, according to several city officials who are favoring the present condemnation proceedings authorized by the Council. Although it is admitted that these extensions will not be built at once, it is the general opinion that the improvements will be made each year, so that an extensive street car service will be given the people of Duluth.

Newark, N. J.—Acting on its own initiative, the board of public utilities commission has fixed June 20 as the date for a public hearing in this city on the proposed elimination of certain grade crossings of the Lackawanna R. R. The crossings involved are in this city, East Orange and Orange. One of the questions to be determined is whether some of the crossings are public highways.

Buffalo, N. Y.—There were no bids received on the \$10,000 bond issue offered as follows: \$350,000 of public general hospital bonds and \$170,000 of grade crossing bonds. Comptroller authorized to sell the issues at private sales within 60 days.

Hickory, N. C.—City Manager John W. Ballew will receive bids June 26 for \$11,000 refunding bonds.

Dunn Center, N. D.—City has voted to bond city for municipal auditorium. Frame construction, 80x40; \$5,000.

Minot, N. D.—See "Water Supply."

Canton, O.—M. U. Gatche, head of the Sanitary Garbage Co., has announced that he will purchase the \$10,000 bond issue for the purchase of the present equipment of the Sanitary Garbage Co. and any new equipment needed in the placing in operation of city controlled garbage collection.

Bethlehem, Pa.—Fountain Hill Borough Council instructed the secretary to purchase six safety zone signs for the school district.

South Brownsville, Pa.—Citizens voted in favor of issuing \$50,000 improvement bonds. T. A. Waggoner, Boro. Secy.

Newport News, Va.—See "Streets and Roads."

St. John, N. B.—City Council decided to construct retaining walls at a cost of \$6,400. Tenders will be called.

Barberton, O.—Following are unit bids received for constructing sewers and pumping station, contract No. 1:

	(1)	(2)	(3)
21,000 cu. yd. earth excavation 0-6 ft.	\$0.85	\$0.94	\$0.75
5,500 cu. yd. earth excavation 6-12 ft.	1.00	1.37	2.00
800 cu. yd. earth excavation 12-18 ft.	1.25	1.88	5.00
100 cu. yd. rock excavation.....	2.50	3.00	5.00
970 lin. ft. 4-in. vitrified pipe sewer.....	.20	.33	.17
2,840 lin. ft. 6-in. vitrified pipe sewer.....	.28	.40	.25
5,600 lin. ft. 8-in. vitrified pipe sewer.....	.40	.50	.35
1,870 lin. ft. 10-in. vitrified pipe sewer.....	.55	.90	.50
280 lin. ft. 12-in. vitrified pipe sewer.....	.72	1.00	.65
1,610 lin. ft. 15-in. vitrified pipe sewer.....	1.00	1.33	.85
870 lin. ft. 18-in. vitrified pipe sewer.....	1.31	1.79	1.25
2,380 lin. ft. 20-in. vitrified pipe sewer.....	1.56	2.02	1.59
8,890 lin. ft. 22-in. vitrified pipe sewer.....	1.96	2.14	2.00
4,580 lin. ft. 24-in. vitrified pipe sewer.....	2.17	2.60	2.50
6 4-in. vitrified pipe specials.....	.63	.50	.75
16 6-in. vitrified pipe specials.....	.88	.75	.75
16 8-in. vitrified pipe specials.....	1.30	1.00	1.00
60 cwt. waterproofing compound.....	4.50	5.00	10.00
4,120 lin. ft. 36-in. segment block sewer.....	3.36	4.45	3.63
4,120 lin. ft. 36-in. reinforced concrete pipe.....	3.42	.....	3.63
10 10-in. vitrified pipe specials.....	1.84	1.60	1.50
100 tons c-i. pipe in place.....	100.00	90.00	95.00
3 tons c-i. pipe specials.....	150.00	150.00	140.00
2 12-in. vitrified pipe specials.....	2.28	2.00	2.00
29 standard MH, 0-7 ft.....	35.00	50.00	70.00
32 standard MH, 7-13 ft.....	65.00	80.00	84.00
7 standard MH, 13-19 ft.....	95.00	100.00	105.00
1 special MH No. 8.....	100.00	150.00	225.00
1 special MH No. 1.....	150.00	150.00	185.00
1 special MH No. 2.....	150.00	150.00	185.00
1 special MH No. 3.....	200.00	150.00	120.00
1 special MH No. 4.....	150.00	150.00	180.00
1 special MH No. 5.....	125.00	150.00	185.00
1 special MH No. 6.....	100.00	150.00	175.00
1 special MH No. 7.....	100.00	150.00	175.00
1 blow-off MH A.....	250.00	300.00	160.00
1 blow-off MH B.....	250.00	300.00	160.00
45 6-in. Y branches on 8-in. pipe.....	.50	1.00	1.00
22 6-in. Y branches on 15-in. pipe.....	2.00	1.50	2.30

30 6-in. Y branches on 18-in. pipe...	2.60	2.00	3.20
20 6-in. Y branches on 20-in. pipe...	3.00	2.50	3.84
83 6-in. Y branches on 22-in. pipe...	4.00	3.00	5.00
23 8-in. stubs in place.....	.80	1.00	.75
40 6-in. slants in place.....	.35	1.00	.75
2 6-in. stubs in place.....	.60	1.00	.65
250 lin. ft. 6-in. vitrified pipe house connections.....	.30	1.00	.50
54 6-in. vitrified pipe specials.....	.88	1.00	.75
5 cu. yd. concrete masonry, Class 1..	12.00	15.00	20.00
15 cu. yd. concrete masonry, Class 2.	10.00	12.00	18.00
1,030 cu. yd. concrete masonry, Class 3.....	8.00	9.00	15.00
10-in. stubs in place.....	1.10	1.00	1.00
295 cu. yd. reinforced concrete masonry.....	16.00	20.00	22.00
1 cu. yd. brick masonry.....	18.00	25.00	17.00
500 cu. yd. earth embankment.....	1.50	.75	1.25
10 M ft. b. m. sheeting left in place.....	40.00	20.00	35.00
300 lin. ft. 8-in. underdrain.....	.40	.50	.50
15-in. stubs in place.....	2.00	2.00	2.00
100 cu. yd. gravel re-fill.....	1.00	3.00	2.00
600 hours common labor.....	.57	.80	.45
30 sq. yd. restoring brick roadway.....	2.00	2.50	2.50
200 sq. ft. restoring cement walks.....	.25	.20	.20
2,600 sq. ft. restoring stone walks.....	.20	.20	.05
40 lin. ft. restoring curbing.....	.50	1.00	.15
50 cu. yd. cinder filling.....	1.00	2.25	1.50
270 lin. ft. ¾-in. w. i. pipe.....	.18	.30	.09
2,100 lin. ft. 2-in. w. i. pipe.....	.52	.55	.32
Wolf Ave. sta. superstructure.....	1,127.00	1,874.00	900.00
Wooster Rd. sta. superstructure.....	900.00	1,433.00	900.00
Pumping equipment, Wolf Ave. (lump sum).....	4,250.00	3,700.00	4,000.00
Ejector equipment, Wooster Rd. (lump sum).....	2,000.00	2,000.00	4,000.00
Ejector equipment, Manchester Rd. (lump sum).....	3,000.00	1,800.00	4,000.00
Miscellaneous metal work (lump sum).....	2,000.00	1,000.00	1,500.00
10-in. subs in place.....	1.45	2.00	1.25
Totals.....	\$128,277	\$140,988	\$144,648

- (1) Hoag & Hall, Commercial Bank Bldg., Cleveland.
(2) John M. McLane Co., Cincinnati.
(3) W. McDowell & Sons, Cleveland.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
N. Y.	Auburn	8 p.m., June 19.	Paving two streets with stone-filled asphalt, bitulithic, brick, asphalt or concrete.	Thomas B. Bergen, City Engr.
Pa.	Elton	noon, June 20.	Constructing 2 miles of highway and reconstructing 2 miles with reinforced concrete or brick. Furnishing 690,000 repressed brick at St. Michaels and 690,000 at Elton	O. P. Thomas, Engr., Leader Bldg., Johnstown.
Ill.	Chiago	11 a.m., June 20.	Paving on streets and alleys with concrete, with asphalt or tar dressing, and improving streets.	Edward J. Glackin, Secy., Bd. of Local Improvements.
Va.	Norfolk	1 p.m., June 20.	Paving between car tracks and two feet outside (contract with railway), and area next to the curb.	City Engineer.
Ind.	Indianapolis	10 a.m., June 20.	Sidewalks on Boulevard place; paving Gilford and Park streets	B. J. T. Jeup, City Engr.
N. J.	Trenton	2.30 p.m., June 22.	Oiling 70,000 to 170,000 sq. yds. macadam streets with 60 per cent to 65 per cent asphaltic oil.	Engineer of Streets.
Wash.	Olympia	June 25.	Grading, draining and surfacing 2 miles of Inland Empire highway from Idaho line west.	James Allen, State Highway Commr.
Ind.	Madison	1.30 p.m., July 3.	Constructing crushed stone roads.	Charles S. Dibler, Jefferson Co. Audr.
Ind.	Lebanon	10 a.m., July 3.	Gravel road	Cleve Goodwin, Boone Co. Audr.
Ia.	Council Bluffs	July 25.	Paving streets and alleys with concrete 16 ft. wide.	E. V. Gustafson, City Clerk.
SEWERAGE.				
Ia.	Davenport	2 p.m., June 19.	449 feet 8-inch sewers, two lamp holes and two manholes.	J. W. Crowley, Comr. of Bd. of Public Works.
Ill.	Chiago	11 a.m., June 20.	Constructing drains in several streets; tile sewers with brick manholes and catch basins.	Edward J. Glackin, Secy., Bd. of Local Improvements.
Mont.	Bozeman	5 p.m., June 21.	360 ft. 15-in. storm sewers and 250 ft. 6-in. sanitary sewers	C. A. Speith, City Clerk.
Mont.	Bozeman	5 p.m., June 21.	2,800 sq. yds. bitulithic pavement.	C. A. Speith, City Clerk.
Ia.	Council Bluffs	June 25.	Sewers in several streets.	E. V. Gustafson, City Clerk.
WATER SUPPLY.				
N. Y.	New York	2 p.m., June 21.	Furnishing and delivering cast iron pipe and specials, valve boxes, valves and double nozzle fire hydrants.	William Williams, Comr., Water Supply, Gas and Electricity.
BRIDGES.				
Tex.	San Antonio	4 p.m., June 25.	Bridge over the San Pedro Creek.	City Engineer.
Wash.	Seattle	10 a.m., June 26.	Constructing Duvall bridge.	Co. Comrs.
Wash.	Seattle	11 a.m., June 30.	Strauss Trunnion bascule bridge, or a Scherzer rolling lift bridge	County Engineer
Ind.	Nashville	1 p.m., July 2.	Constructing two steel and concrete bridges.	Omer Morrison, Co. Audr.
Ind.	Vevay	1 p.m., July 2.	Steel bridge in Craig township.	J. W. Smith, Co. Audr.
MISCELLANEOUS.				
Pa.	Olyphant	8 p.m., June 20.	Repairing concrete wall and culvert.	William A. Taylor, Borough Engineer.
Wash.	Seattle	June 22.	500 k.w. motor generator and four oil switches.	Board of Public Works.
Ore.	Cloverdale	10 a.m., June 23.	Constructing drainage ditches and selling \$8,000 bonds.	Big Nestucca Drainage Dist.
O.	Columbus	noon, July 1.	Constructing steel dredge; to be three-fourths-yard portable, oil burning.	F. R. Fauver, Supt. of Public Works, State House Annex.
Ind.	Madison	1 p.m., July 2.	One portable gyratory rock crusher with a capacity of 10 tons to 29 tons per hour.	Charles S. Dibler, Co. Audr.

STREETS AND ROADS.

San Jose, Cal.—Governor William D. Stephens signed the so-called "Skyline" bill for a military road south from San Francisco along the skyline. An appropriation of \$250,000 was made toward construction of this road.

Bridgeport, Conn.—Commissioners will delay widening and paving of Water St. until the proposed interceptor sewer is built through the street.

Stamford, Conn.—Town Treasurer Wm. J. Guebelle receiving bids June 26 for \$75,000 road improvement coupon registered bonds.

Boise, Ida.—The \$1,000,000 fund necessary to get active construction work under way on the north and south highway has been raised through the bond issues voted by the counties and state and federal aid.

Jeffersonville, Ind.—Clark County highway bonds, \$8,500, 4½ per cent, ten years, were sold to the First National Bank of Jeffersonville, Ind., for \$15 premium and accrued interest.

Lafayette, Ind.—Tippecanoe County road improvement bonds to amount of \$5,600 were awarded to Edw. O'Gara, of Lafayette, Ind., for \$7 premium and accrued interest.

Plymouth, Ind.—Bonds issued by Green

Township, Marshall County, \$16,000, 4½ per cent, ten years, were sold to J. F. Wild & Co., Indianapolis, for \$65 premium.

South Bend, Ind.—J. F. Wild & Co., Indianapolis, were successful bidders for \$30,000 St. Joseph County highway bonds, paying premium of \$61. These are ten-year bonds and bear 4½ per cent, interest.

Des Moines, Ia.—Preparations for the construction of permanent roads in Iowa under the federal aid law, the provisions of which were accepted by the last legislature, are now being made by the State Highway Commission. The Commission has figured out the approximate amounts which each county will receive under the law, and will soon publish a bulletin explaining to the county supervisors just what will be necessary to obtain the government funds. It is estimated that Iowa's share of the federal appropriation for the five-year period will be \$2,192,540.35. This amount will go to the counties in proportion to their area in square miles. This will give Kossuth County the largest share, estimated at \$38,034.70. Pottawattamie is next with \$37,409.90. Every county will receive its apportioned share of federal aid funds, but it is not planned to begin work in all sections of the state at once.

Minneapolis, Minn.—Park Board ac-

cepted the report of Supt. Theodore Wirth and A. C. Godward, park engineer, recommending tar macadam for the park circuit of boulevards known as the Grand Rounds. Laying of the new paving will begin at once on boulevards surrounding Lake of the Isles and Lake Calhoun.

Red Wing, Minn.—County Commissioners have decided to divide the annual road and bridge fund; also figured out what the towns and villages are to receive from the county in the way of road appropriations. The state this year gave Goodhue County \$18,500 for state roads and bridges. To this the county added a like amount, giving it \$37,000 to work with. From this amount \$5,870 is deducted for a large bridge in Zumbrota, \$5,000 for miscellaneous culverts in various parts of the county, and \$8,300 for maintenance of roads and bridges during the year. The county, therefore, had \$17,830 left for division among the five commissioner districts. Road work: Pine Island town, \$300; Kenyon town, \$1,000; Kenyon village, \$300; Zumbrota town, \$400; Zumbrota village, \$250; Leon, \$500; Dennison village, \$150; Hay Creek, \$300; Vasa, \$900; Cannon Falls town, \$300; Red Wing, \$1,500; Burnside, \$400; Welch, \$200; total road money, \$7,000. Bridges: Roscoe, \$1,000; Cherry Grove, \$950; Minneola, \$1,000; Wanamingo, \$1,500; Holden, \$850; Belvidere, \$600; Goodhue town, \$800; Belle Creek, \$800; Warsaw, \$650;

Florence, \$350; Featherstone, \$500; total for bridges, \$9,000.

Hattiesburg, Miss.—Board of Supervisors approved petition for a new road about 1 mile long from McInnis Springs to the McCallum road. R. M. Hendrix, Chairman.

Vicksburg, Miss.—Commissioners have decided to order new concrete sidewalks on Main, First North, Washington, Farmer, Catherine, Dabney and Drummond Sts.

Lodi, N. J.—Borough Council authorized the street committee to advertise for bids for the improvement of Kipp and Central Aves.

Princeton, N. J.—Borough Council has voted that Stockton St. shall be paved with Warrenite and that work shall begin as soon as the specifications are approved by the State Road Department.

Trenton, N. J.—Former County Engineer Theodore Tobish was appointed engineer for Hamilton Township by township committee and will serve as the technical director of the extensive program of public improvements. One act will be the formulation of plans for the laying of a granite block pavement which is to be constructed in conjunction with the Pennsylvania Railroad Co. in vicinity of Konover's crossing.

Syracuse, N. Y.—Council ordered the resurfacing of the brick pavement in South Ave., from West Onondaga St. to Cortland Ave.

Canton, O.—A second attempt will be made by the county commissioners to secure proper bids for the contracts to pave the Meyer's Lake road and the Canton-Middlebranch road. The specifications have been changed to include fiber brick.

Hamilton, O.—See "Sewerage."

Hamilton, O.—Resolutions adopted ordering sidewalks constructed in front of certain lots in Vine St. and North Fifth St.

Portland, Ore.—State Highway Commission decided that the first 10 miles

section of pavement to be laid would be in Umatilla County, on the road from Pendleton towards Walla Walla. The second section will be in Washington County, on the Rex-Tigard road. The counties are to prepare the road bed.

Bradford, Pa.—Ordinance introduced in Council authorizing an \$80,000 bond issue for repaving South Ave. and Mechanic St., between Barbor and Corydon Sts.; Kennedy St., between Main St. and the Tunungwant Creek; Davis St., between Main and Amm Sts.; portions of East Main St., between Main St. and Kendall Ave.; also laying surface sewers; paving High St., between Grove St. and South Ave., between Sherman St. and the city line; portion of Jackson Ave., between Mill St. and Kendall Ave. E. C. Charlton, City Clerk.

Eric, Pa.—Council granted petition for the pavement of 22d St., Ash to Wayne, and directed preparation of an ordinance.

Harrisburg, Pa.—A bill introduced by Representative M. J. Ruddy, of Lackawanna, calling on the state to take over a road leading from Mount Cobb through Cortez and connecting with a state road at South Canaan, passes second reading.

Meyersdale, Pa.—Citizens will be called upon on July 10 to vote on a bond issue of \$20,000; \$14,000 will be for street improvements and \$6,000 for sewer extension.

Austin, Tex.—See "Sewerage."

Madison, Wis.—More than 1,000 miles of roads and 350 bridges will be built this year according to the State Highway Commission. This work will be entirely separate from the trunk line work to be constructed under the federal law. According to State Highway Commissioner A. P. Hirst, the total fund available for road and bridge construction this year is \$4,200,000. Following are the number of miles and character of roads to be built this year: Graded but not surfaced, 485 miles; concrete, 66 miles; stone macadam, 210 miles; gravel macadam, 320 miles; other permanent macadam, 65 miles; non-permanent macadam, 100 miles; total, 1,245 miles.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Jonesboro, Ark.—*Kaw Paving Co., Topeka, Kan., by city, paving 16 miles streets, \$300,000.

Lewiston, Ida.—Lewiston Highway Commission awarded *Mitchell Bros., of Spokane, at \$68,073, for construction of two units of highway in the district, one of 4½ miles extending toward the Genesee section from the top of the hill and one 5 miles extending easterly from the north approach of the 18th St. bridge along the north bank of the Clearwater River to the easterly side of the district. The latter unit will be a part of the north and south highway and also of the Lewis and Clark State Highway.

Bluffton, Ind.—Wells County Commissioners awarded contracts for two stone streets and one stone road to *D. O. North and *M. Alexander, both of Bluffton, Ind., the former receiving two contracts at \$3,498 and \$6,287 and the latter one at \$4,564.

Crawfordsville, Ind.—*Pat Thaham, of Lebanon, Ind., will build a gravel road for Montgomery County at cost of \$5,800.

Kokomo, Ind.—The County Commissioners have let the contract for the Hodson road in Taylor Township to *John Fenn, on his bid of \$2,898.

Monticello, Ind.—Board of Commissioners let two road contracts to *Spencer & Unroe, the Hepp road in Liberty Township, at \$5,990, and for the Matthew road in Princeton and West Point Townships, at \$15,970.

Mount Vernon, Ind.—Posey County Commissioners let the contract for 13,321 ft. of gravel road to *L. Thomas, of Mt. Vernon, Ind., for \$6,313.

Rensselaer, Ind.—*Harry E. Gifford, of Rensselaer, Ind., was given contracts for three Jasper County roads. Two roads were awarded to *Johnson & Sabrin, of Medaryville, Ind. No bids were received for three other roads advertised for letting at the same time.

Books for the Waterworks Engineer or City Official

Public Water Supplies

By F. E. Turneaure and H. L. Russell.

This describes the requirements, resources and construction of works for public water supplies and is prepared especially for the engineer, superintendent or other technical man. A chapter on pumping machinery has been contributed by D. W. Meade. This is a reliable and up-to-date treatise on the whole field of water supply, and is believed to be the best book which has yet been brought out on this subject. It is in its second edition; contains about 800 pages. Price, \$5.

Operation of Water Purification Plants.

By Milton F. Stein.

The only book describing the latest types of construction and methods of operating water purification plants. Price, \$2.50.

The Value of Pure Water.

By George C. Whipple, of Harvard University.

The purpose of this book is to illustrate the fact that impure water affects not only the health and comfort of a community, but also the individual pocketbooks of the people. It contains 80 pages and sells at \$1.

Clean Water and How to Get It.

By Allen Hazen.

Mr. Hazen's book is a brief explanation in non-technical terms of why water should be purified, and the more generally used methods and appliances for purifying it. Its object is to set forth first principles for those who have no expert knowledge of the subject. 174 pages. Price, \$1.50.

Waterworks Management and Maintenance.

By Winfield D. Hubbard and Wyncoop Kiersted.

Is probably the only book which deals to the extent of more than 400 pages solely with the operation of a water works system. It is, therefore, especially suitable for the superintendent or manager of a plant. The subject is treated from both the engineering and the business standpoint. Price, \$4.

Treatise on Hydraulics.

By Mansfield Merriman.

This is the ninth edition of a work which has been a standard text book on the subject of hydraulics for many years. The latest edition has been revised with the assistance of Professor Merriman's son, Thaddeus Merriman, 565 pages. Price, \$4.

Waterworks Handbook.

By A. D. Flinn, R. S. Weston and C. L. Bogert.

A new book which gives information for the waterworks engineer, superintendent, operator or inspector. The book treats of sources of supply, collection, transportation, distribution and treatment of water. Filtration and other forms of treatment are described. Specifications are given in plain language. 824 pages. Price, \$6.00 net.

Elements of Water Bacteriology.

By S. C. Prescott and C. E. A. Winslow.

Is in its third edition. Contains about 270 pages, and while it pretends to deal with only the elements of the subject, these elements are treated in a thoroughly scientific manner by experts on the subject. Price, \$1.75.

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Calls for bids reaching New York by 10 o'clock Thursday morning will be published in the issue mailed that night.

Salem, Ind.—*E. Huckleberry and Elisha Fleenor will build a road for Washington County at a cost of \$6,298.

Dayton, O.—*J. Wise, 435 Grafton Ave., by County Commissioners, paving portion Keowee St. \$52,000.

New Kensington, O.—*Rinehart Bros., East Liverpool, by County Commissioners, Greensburg, 1½ mile road.

Lynchburg, Va.—The contract between the authorities of Campbell County and *S. B. Bennington, contractor, for the improvement of the Link road was signed.

Bellingham, Wash.—J. A. Miller, Auditor Whatcom County, reports followings bids opened for paving: Ferndale-Lynden road (River road), K. Sauset, Bellingham, low, \$108,202; Independent Asphalt Paving Co., Seattle, \$113,863; G. A. Ferguson, Seattle, \$117,422; H. J. Kaiser, Everett, \$119,849; Ledingham & Cooper, New Westminster, \$12,635; C. E. Lind, Bellingham, \$120,072. County Engineer Chas. A. Lindberry estimated the cost at \$96,300. Contract has not been awarded to date. Involves 65,300 sq. yds. of concrete paving. Following bids submitted for Mt. View road, involving 48,700 sq. yds. of concrete paving: K. Sauset, Bellingham, low, \$91,450; Ferguson Construction Co., Seattle, \$91,936; C. E. Lind, Bellingham, \$95,463; Kaiser Paving Co., Everett, \$99,610.

SEWERAGE.

Sacramento, Cal.—City Commission passed resolution providing for construction of an 8-in. vitrified ironstone pipe sewer in the alley between U St. and March Court in T St. Addition. M. J. Desmond, City Clerk.

Coeur D'Alene, Ida.—O. W. Edmonds, city clerk, reports council has passed an ordinance providing for the flushing, cleaning and repairing of the sewer system within the city limits. Bids will be called for at an early date.

Monroe, La.—Council referred petition to the sewer committee for a 6-in. sewer on 2d and 3d Sts., beginning at Stubb's Ave. and intersecting the Hudson Ave. main.

Great Falls, Mont.—Council petitioned for a special improvement district for a sewer in 5th alley north, between 19th and 21st Sts.

Schenectady, N. Y.—Council appropriated \$40,000 for general sewer purposes, part of which will go for sewers in Rugby Rd. and Eastern Ave., the former to be a trunk sewer running from Wendell Ave. to Wesley alley.

Hamilton, O.—Sanitary sewers were ordered installed in Shuler Ave., between Cornell and Lincoln Aves.; also sidewalks and the roadway graded and graveled.

Meyersdale, Pa.—See "Streets and Roads."

Austin, Tex.—Attorney General's Department approved the following bond issues: City of Waco, sanitary sewers, \$25,000, and street improvement, \$25,000, also fire station, \$35,000; Brazoria County Road Dist. No. 10, \$20,000.

Waterville, Wash.—R. W. Waterhouse, clerk, reports council has passed a resolution providing for the construction of a sewer on Chelan Ave. 125 ft. north of 1st St., to Ash St.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Sacramento, Cal.—City commission awarded *J. W. Terrell for constructing an 8-in. ironstone pipe sewer in Portold way (formerly known as 1st Ave.). M. J. Desmond, city clerk.

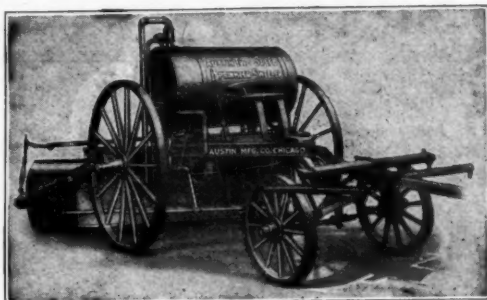
Kenosha, Wis.—*P. Brandsen, at \$26,140, by city sewer in Brockett St.

WATER SUPPLY.

Atlanta, Ga.—Plans are being considered for furnishing water to cantonment camp, established near Ben Hill. Estimated cost, between \$50,000 and \$60,000 for constructing water pipe to site and furnishing water.

Rogers, Neb.—Town plans to install water system, including tower.

Johnstown, N. Y.—Water board retained James P. Wells, a consulting en-



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Austin Pressure Road Oiler

gineer of Rochester, to assist City Engineer Natanson in preparing plans for the construction of the proposed new storage reservoir for the city.

Enid, Okla.—City voted in favor of \$50,000 bond issue for enlarging the capacity of the water works.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Ironton, O.—*Mountain, Scherrer & Grimes, by city, installing water main from pumping station to reservoir.

LIGHTING AND POWER.

Davenport, Ia.—City council approved the recommendation of the light committee and ordered the installation of 15 new arc lights throughout the city.

Calgary, Alta.—R. A. Brown and A. V.

Bilton, City Hall, plan erection of an electric light and power plant.

Gloucester City, N. J.—Council petitioned for an electric light on South Broadway.

Perth Amboy, N. J.—Ordinance passed providing for the issuance of \$50,000 municipal electric light equipment bonds of the city. John Hanson, Jr., city clerk.

FIRE EQUIPMENT.

Fresno, Cal.—An appropriation of \$137.50 was allowed for the purchase for the fire department of a fire net.

Eric, Pa.—Council authorized Safety Director Henry Kessler to request bids for an auto for Fire Chief J. M. Duerner. At the same time bids will be opened for repairing No. 2 engine house.

Maugansville, Md.—Purchase of a chemical engine is considered by the residents.

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Macadam and Tandem Roller—
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Journal.

Compressors

- 1 Ingersoll-Rand, Imperial Type X-B-2, cap. 2,400', belt-driven.
- 1 11x12 Laidlaw-Dunn-Gordon belt-driven machine.
- 1 Sullivan 2-stage, steam-driven, cap. 550'.

Drag-Lines

- 1 No. 2 Monaghan, 65' boom, 2½-yard bucket.
- 1 Page drag-line, 50' boom, 1-yard bucket.

Hoisting Engines

- 2 3-drum 8¼x10, with or without boilers.
- 2 7x10 D. C. D. D. hoists.
- 1 6¼x18 D. C. D. D. hoist with boiler.

Cranes

- 1 15-ton 4-wheel McMyler, 44' boom, 1½-yard clam-shell bucket.
- 1 15-ton 4-wheel Browning, 40' boom, 1½-yard bucket.

Crushers

- 1 No. 3 Austin.
- 1 No. 3 Gates.
- 1 No. 4 Austin.
- 1 No. 5 McCully.
- 1 No. 5 Austin.
- 1 No. 6 Gates Style "K," complete plant.

Cars

- 30 4-yard Western 30" gauge cars.
- 35 1½-yard Western 24" gauge cars.

Steam Shovels

- 1 No. 1 Thew Traction Shovel, 1¼-yard, first-class.
- 1 No. 6 Thew Shovel, first-class.

Koppel Track

- 5 Miles 24" track, good as new.
- 1 15-ton Shay gravel locomotive.

Dump Trucks

- 3 White 5-yard dump trucks.
- 2 White 6-yard dump trucks.

Tractors

- 1 Holt Caterpillar, good as new.
- 1 International Mogul, good as new.
- And others.

George C. Marsh & Co.

791 Old Colony Bldg., Chicago, Illinois

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C. June 1, 1917.—Sealed Proposals will be opened at this office at 3 P. M., July 12, 1917, for the construction of the United States Post Office at Hoopes-ton, Ill. Drawings and specifications may be obtained from the Custodian of the Site at Hoopes-ton, Ill., or at this office, in the discretion of the Supervising Architect, JAS. A. WETMORE, Acting Supervising Architect.

PROPOSAL ADS in

Municipal Journal

Bring Results

PROPOSALS FOR

Street Improvements

AT

Clinton, N. C.

Sealed Proposals for constructing Street Improvements in the Town of Clinton, N. C., will be received by the Mayor and Board of Commissioners until 12 o'clock noon on the 19th day of June, 1917.

The work will consist of approximately 11,000 square yards of Sheet Asphalt, or other pavement, on a concrete base, or of Concrete Pavement, together with the necessary curbing, gutters, etc.

Blank forms of proposal and specifications may be obtained from the Engineer. Plans are on file with the Town Clerk. Certified check for five per cent. (5%) of the bid is to accompany the proposal.

The right is reserved to reject any or all bids.

H. A. GRADY, Mayor.

H. A. JAMES, Clerk.

Engineer.

WM. M. PIATT, Durham, N. C.

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CITY MANAGER

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Goldsboro, North Carolina, invites applications for the position of City Manager. Goldsboro is a progressive city of over 11,000 inhabitants, with healthful climate and good trade conditions—located on three railroads in the heart of the most fertile section of eastern North Carolina.

Applicant must have pleasing personality, good business judgment and broad vision. One possessing qualifications of Sanitary Engineer preferred, though this is not absolutely essential.

Excellent opportunity for energetic man of ability to produce results.

Salary will probably range from \$200.00 to \$250.00 per month. Applications will be received up to July 1, 1917. Information and data furnished upon request.

CITY MANAGER COMMITTEE,
P. O. Box 461, Goldsboro, N. C.

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- 345 pcs. 16-ft. Lackawanna 7"x¾"
- 363 pcs. 20-ft. United States 12"x¾"
- 585 pcs. 20-ft. United States 12"x¾"
- 125 pcs. 35-ft. Lackawanna 4"x¾"

All first-class driving condition. We have a large stock of all makes, in various lengths. What do you need?

CARS, LOCOS, EQUIPMENT, etc.



City of Reading

DEPARTMENT OF STREETS AND PUBLIC IMPROVEMENTS

June 2nd, 1917.

Sealed Proposals will be received at the office of the City Clerk, Reading, Pa., until 10 A. M., Wednesday, June 20th, 1917, for the following work:

Contract No. 1

21,000 square yards of sheet asphalt resurfacing and repairing, price to be either by square or cost plus basis.

Contract No. 2

1,590 square yards vitrified block paving.
1,160 square yards vitrified block resurfacing.
Price to be by square yard.

Contract No. 3

20-inch House Sewer Trunk Line, consisting of the following approximate quantities:

- 2,760 lineal feet 20-inch vitrified pipe sewer.
- 12 lineal feet 20-inch cast-iron pipe sewer.
- 1,000 lineal feet tunnel back fill.
- 65 vertical feet reinforced concrete manhole.
- 40 vertical feet reinforced concrete manhole with drop well.

12,000 feet B. M. lumber in place.

Plans and specifications may be obtained by prospective bidders by making a deposit of \$5.00 for Contract No. 1, \$5.00 for Contract No. 2 and \$15.00 for Contract No. 3 with the City Engineer, City Hall, Reading, Pa., who will also furnish any other information which may be desired.

Deposits for plans and specifications will be refunded upon return of same prior to June 23rd, 1917.

Proposals must be endorsed as to the contract bid on and addressed to the Superintendent of the Department of Streets and Public Improvements, in care of the City Clerk, Reading, Pa.

The right is reserved to reject any or all bids.

EUGENE I. SANDT,

EDMUND B. ULRICH, Superintendent.
City Engineer.

ELECTRIC TRACTION SHOVEL

Little Giant, 1¼-yd. dipper, 3-phase, 60-cycle, 440 volts A. C.

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BRING RESULTS**

PROPOSAL ADVERTISING

Bids open June 21, 1917.

Notice to Contractors PAVING

LEBANON, PA.

Sealed Proposals, directed to Dan. M. Sharp, City Clerk, will be received by the Mayor and Council of the City of Lebanon, Pa., at the City Hall, until 5 P. M., Thursday, June 21, 1917, for the furnishing of all labor and materials required to construct pavements as follows:

Seventh Street—approximately 1,100 square yards.

Sixth Street—approximately 2,800 square yards.

New Street—approximately 1,600 square yards.

Fifth Street, south of Willow—approximately 2,600 square yards.

Fifth Street, north of Willow—approximately 3,100 square yards.

Alternate bids will be received on a 6-inch concrete pavement and on wood block, vitrified brick, bitulithic and topeka, each on 5-inch concrete base.

Specifications, proposal blanks and information concerning the manner of submitting bids can be obtained from the City Engineer upon a deposit of Five Dollars (\$5.00), which will be refunded upon the return of specifications in good condition.

Plans of streets and standard structures may be seen at the City Engineer's office.

Certified checks of the different amounts called for on the several proposals must accompany each bid.

The Mayor and Council distinctly reserve the right to reject any or all bids and to award the contract as is deemed to the best interest of the City of Lebanon.

PAUL A. VOLCKER,

City Engineer.

Notice to Road Contractors

Notice is hereby given that the Board of Commissioners of Tippecanoe County, State of Indiana, at the County Auditor's office, in the City of Lafayette, Indiana,

on the third day of July, 1917,

up to the hour of ten o'clock A. M., will receive bids for the construction of 2.60 miles of brick road improvement in Fairfield Township, to be known as the M. P. Sheehan et al. road.

Also 2.02 miles of brick road improvement in Wabash Township, to be known as the Henry Klinker et al. road, as ordered by said Board to be constructed; and at the said time will let to the lowest responsible bidder, to contract for the construction according to specifications, plans, profile, estimate, etc., now on file in the office of the County Auditor of said county, at Lafayette, Indiana.

Bidders will be required to file with their bids bonds for double the amount of said bids, conditioned according to law, at least one of which sureties on such bond must be a resident of said county, or a surety company doing business in the county, and affidavits denying collusion as the law provides.

The right to reject any and all bids is reserved.

A reasonable time, to be hereinafter fixed, will be allowed for completing the work.

GEORGE W. BAXTER,

E. S. MINTON,

Engineer.

Auditor.

Blwabik, Minn.—City council has decided to improve the fire fighting equipment. The clerk was instructed to advertise for bids for a combination chemical engine and hose motor car, the bids to be opened either at the mid-month meeting or on the first of the month.

Austin, Tex.—See "Sewerage."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Fresno, Cal.—Board of city trustees accepted bid of the *Republic Rubber Co. for the purchase of 2,500 ft. of fire hose.

Sacramento, Cal.—City commissioners voted to purchase the three pieces of motor-driven fire apparatus from the American-La France Co. Includes a 6-cylinder pumping engine and two tractor hose wagons.

Vicksburg, Miss.—City commissioners purchased from the Miller Automobile Co. a 6-cylinder, 65-h.p. Haynes automobile for the use of the fire chief.

BRIDGES.

Redding, Cal.—See "Streets and Roads."

San Jose, Cal.—Board of Supervisors authorized Supervisors' Roll to repair the bridge on San Tomas Aquino Creek on the Williams Road.

San Jose, Cal.—Plans and specifications for the Willow St. bridge as approved by the city engineer were adopted.

Waterloo, Ia.—City Engineer C. T. Wilson is preparing estimates of the cost of constructing a bridge across Black Hawk Creek for the proposed extension of the street car line to Hagerman addition, to be submitted at the next meeting of the city council.

Blwabik, Minn.—Council decided to replace with concrete a number of wooden culverts.

Red Wing, Minn.—See "Streets and Roads."

Walker, Minn.—Cass County board passed a resolution to sell \$11,000 in bonds to pay the county's shares of building bridges in conjunction with Itasca, Todd, Wadena and Morrison Counties, as follows: Across the Mississippi River at a point 2 rods north of the Great Northern right of way, where said right of way crosses the Mississippi River in Twp. 145, Range 26. One across the Mississippi River on the range line between ranges 25 and 26 in Twp. 32. One over the Crow Wing River at the village of Pillager. The Deer River bridge, as one is called, will cost in the neighborhood of \$19,000, of which Cass will pay one-nineteenth, while the other bridge, over the Mississippi, near Ball Club, is a half-and-half proposition and is estimated at \$6,500.

Duluth, Minn.—County commissioners directed that formal application be made to the secretary of war and the board of army engineers to approve the plans for the proposed Fond du Lac bridge. The plans have been prepared by the Duluth Engineering Co. and R. W. Acton, county highway engineer, and call for a 13-arch reinforced concrete and steel bridge to cost between \$60,000 and \$75,000. The bridge will span the river at Fond du Lac at the point specified in an act of Congress passed last year.

Menasha, Wis.—Council authorized the bridge committee to prepare plans for the construction of a concrete sidewalk the entire length of the Mill street bridge. City engineer was instructed to carry out the extension of 3d St. W. from Tayco St. to the lake.

New Brunswick, N. J.—Plans for a modern lift draw bridge to be constructed at a part of the Albany St. bridge across Raritan River here have been started by County Engineer Alvin Fox, according to reports filed at a meeting of the Board of Freeholders. Work will be started on August 1.

Schenectady, N. Y.—Governor Charles S. Whitman signed the gateway bill, appropriating \$15,000 for the preparation of plans and specifications for a concrete bridge over the Mohawk, which is expected to be built at some future time. Plans and specifications are to be completed by the state engineer on or before December 1, 1917.

Hershey, Pa.—Plans have been approved by State Water Supply for constructing 3-arch, earth filled, reinforced concrete bridge across Swatara Creek here.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Kankakee, Ill.—*Continental Bridge

Co., Peotone, Ill., at \$5,000, for West Station bridge repairs, by Coms. of Kankakee County. Frank N. Enos, Supt., Kankakee.

Muscatine, Ia.—City council awarded *Fuller Bros., of Muscatine, for the filling of the new bridge in E. 2d St., over Mad Creek.

Orangeville, Ill.—Contract for the construction of a concrete bridge in Stephenson County let to *Northern Steel & Concrete Company of Freeport, at \$7,498. Will be 80 ft. long, two 40-ft. spans. Bidders were: Clarno & La-borde, Orangeville, \$7,600; W. H. Shons, Freeport, \$7,589; N. S. Weatherell, Chicago, \$8,200; W. J. Liljequist, Freeport, \$7,960. With the approaches and other extras the bridge will represent an outlay of approximately \$10,000.

Duluth, Minn.—County Commissioners let to the *A. T. Nelson Co., for constructing a 16-ft. bridge on the Maple Grove Rd., in the 1st Dist., cost, \$1,270; for the installation of a concrete culvert on the Stiff Line road, \$1,700; for the construction of a 24-ft. timber bridge over Bug Creek, on the Sundvick road, 5th Dist., \$500.

MISCELLANEOUS.

Manson, Ia.—At a joint meeting held in Storm Lake it was decided by the Boards of Supervisors of Calhoun, Pocahontas, Sac and Buena Vista Counties to spend one million dollars for a drainage ditch. This is probably the largest drainage project yet ordered in the entire state and is known as the Big Cedar drain and follows the course of Cedar Creek from away up near the Clay-Palo Alto County line down the line between Pocahontas and Buena Vista Counties, cuts across the northwest corner of Calhoun County and empties into Raccoon River in Sac County. Its source is to be in the extreme northwestern part of Pocahontas County. The petition was circulated by M. W. Fitz in June, 1912, and was finally granted. The big drain will destroy 1,200 acres of land, or almost two entire sections.

Monroe, La.—After a delay of several years, the city made good its promise to the government to build suitable wharves and dock facilities here for handling river traffic by budgeting \$15,000 for the construction of the wharves and warehouse.

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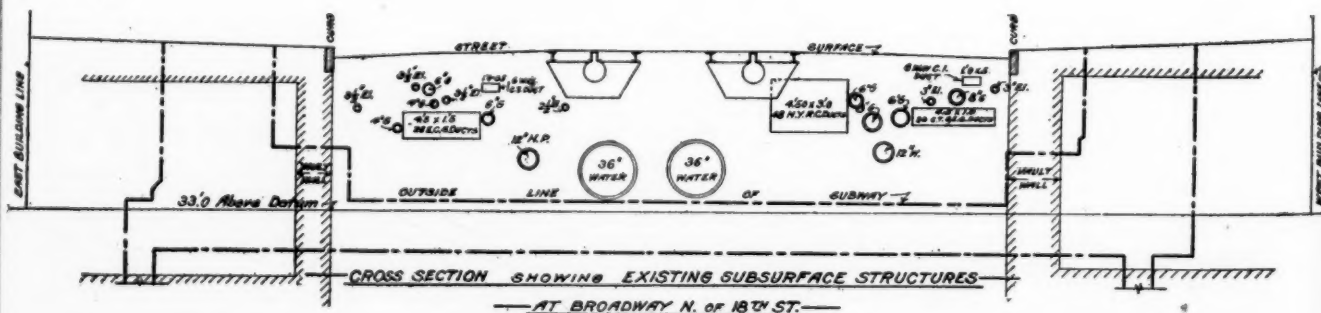
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